The Commercial Car Journal

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DEALERS DECIDE TO BOYCOTT STANDARD OIL COMPANY

The Pittsburgh Automobile Dealers' Association has decided to buy no more oil from the Standard Oil Co. until its prices are adjusted. The city council of Minneapolis has asked Congress to make an investigation and to place an embargo on shipments of oil to the warring nations. It has also asked the Standard Oil Co. not to open any more filling stations in that city until it has cleared itself of all insinuations and charges as to monopoly and price manipulation. A similar investigation has been asked by the Ohio Automobile State Association, Akron, and a provisional organization has been formed in Detroit to discuss ways and means of competing with the present gasoline situation. The National Automobile Chamber of Commerce has been asked to push whatever methods are deemed advisable to relieve the situation.

POSSIBILITIES OF ALCOHOL

Howard F. Weiss, director of the United States Forest Products Laboratory, Madison, Wis., has made a report to the Federal Government stating that the Madison laboratory produced about thirty-five gallons of grain alcohol from one ton of sawdust at a cost of between 13 and 15c. per gallon. He stated that a motor car would not go as far on a gallon of alcohol as it would on a gallon of gasoline with the present type of engine, but with alterations and improvements so that the engine would stand a higher explosive compression, the thermal energy of alcohol would equal that of gasoline.

He stated that the lumber cut in this country amounts to 40,000,000,000 ft. annually, and using only waste of the saw mills, he estimates that 500,000,000 gallons of alcohol could be manufactured each year.

FIGHTING THE FRAUD DEALER

The A. A. A. and the Ohio State Automobile Association are fighting fraud dealers who send out circulars and catalogs in which standard parts and equipment are listed at from ½ to ¾ less than the usual prices. When orders are sent in by owners for certain parts, they receive, as a rule, parts or equipment other than ordered with a statement that the dealers are out of the particular kind desired with a suggestion that what is sent is just as good. Judge Richard H. Lee, Cleveland, O., counsel for the A. A. A. and the Ohio State Automobile Association, asked the Postoffice Department to issue a fraud order against these dealers.

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MEDICAL COMPANY ESTABLISHES AUTO FREIGHT BETWEEN PHILADELPHIA AND NEW YORK

The H. K. Mulford Co., Philadelphia, a medical concern, has established its own auto freight route between Philadelphia and New York in order to expedite the shipment of its vaccines and medical preparations to Europe for the warring nations and to South America. Three trucks—two 3-ton and a 5-tonner make two trips every week. B. W. Kerr, shipping manager of the laboratories, states that it takes about ten or twelve days and sometimes three weeks to send materials as railroad freight from Philadelphia to New York, where formerly goods shipped late at night would be on the docks in New York City early the next morning. He states that it is absolutely essential for vaccines and other preparations to reach certain ships when they can be kept at an even temperature during long voyages.

GASOLINE TO BE MADE BY AUTOMOBILE MANUFACTURERS

A company has been formed by manufacturers of automobiles to be known as the United Motor Fuel Corporation of Manhattan, the ultimate capitalization of which will be between $5,000,000 and $10,000,000. The company, which was incorporated in Albany, has for its purpose the production of gasoline, kerosene and lubricating oil, as well as all by-products of crude oil.

The directors are: S. A. Miles, manager of the New York and Chicago Automobile Shows; J. A. Royall, for many years identified with the production of gasoline; A. L. Prindle, C. H. Mapledoram, a lawyer with offices at 100 Broadway; E. L. Gluck, T. V. R. Fiske, E. W. Stettit, C. H. Alams, C. J. Elias, W. Sterin, A. T. Swords, W. Little, New York; H. Forbes, Ridgewood, N. J.; H. Carter, Plainfield, N. J., and J. C. Barr, of Brooklyn.

Mr. Miles, in behalf of the automobile interests, stated that motorists are now paying at the rate of $157,248,000 a year more for oil than they were in August, 1915.

Mr. Royall stated that the formation of the corporation was the only remedy for existing conditions, but it is not the purpose of the corporation to disturb the great oil industry by resorting to destructive methods of competition, nor to single it out for attack by any other method, but only to create a highly organized company, operating for profit, with the highest ideals of business integrity in all its dealings with the people and further to open the book of knowledge concerning the oil business.

STANDARDIZATION OF TRACTOR PARTS PROPOSED

The National Gas Engine Association at its recent meeting in Chicago voted on the formation of a tractor section as a branch of the Standards Committee of that body.

Among other business the standardization of tractor engine accessories was taken up, including the standardization of magneto mounting dimensions, couplings, spark plugs, screw threads, tap and die limits, carburetor fittings, clutch pulley spiders, fan belt speed and horsepower rating. The ⅞ spark plug with 18 pitch, same as adopted by the S. A. E., was recommended for tractor engines, as well as the standard magneto dimensions of the S. A. E.

The Standards used by the S. A. E. form the basis to a great extent of the discussion of the standards for tractors and it is expected that the next meeting will see even a closer co-operation with the S. A. E.

The CCJ has most readers because it gives most information

N. A. A. A. J. TO MEET IN HOT SPRINGS

The National Association of Automobile Accessory Jobbers will hold its Spring meeting at The Homestead Hotel, Hot Springs, Va., on May 9, 10, 11 and 12. A large attendance of members is expected as well as visitors from various parts of the country. The first two days will be devoted to meeting of the directors and various committees and the last two to general sessions. A great many subjects of general interest to the trade will be discussed.

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The Chicago Pneumatic Tool Co., Chicago, maker of the Little Giant truck, announces that hereafter standardized units will be used in its latest truck models, such units being included as the Continental engine, Timken worm drive, Brown-Lipe transmissions, Schebler carburetor, etc. This company formerly made all these parts in its own factory, but has been forced to acknowledge that several makers could equal its products and at the same time sell them cheaper than the company could make them itself.

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What will, without doubt, be the greatest gathering of salesmen ever witnessed in the history of the world, will be held next July from the 9th to the 13th, in Detroit, and will be known as the World's Salesmanship Congress. This gathering is the first of a series of annual conventions of salesmen and executives in every line of business, in which the automobile contingency will figure most prominently. Every country in the world will be represented and those who have been instrumental in calling this convention feel assured that this is the first step in bringing the profession of salesmanship to the high standard to which it is entitled among business organizations of the world.

Detroit was chosen first, because it is one of the most active selling centers in the world; second, because it is now the commercial and geographic center of the world at peace, and is easily reached by rail or water from any part of the United States, Canada, China or Japan; third, because the Congress originated within that city's limits. The Congress is the outgrowth of the Salesmanship Club of Detroit, and lists among its members names of salesmen and salesmanagers known the world over wherever business is transacted. Among the men in the automobile industry, who are prominently connected with this movement may be mentioned: Hugh Chalmers, president, and Paul Smith, vice-president of the Chalmers Motor Co.; Lee Anderson, commercial manager of the Hupp Motor Car Corp.; Harry W. Ford, president of the Saxon Motor Car Co.; Norval A. Hawkins, sales manager of the Ford Motor Co.; W. C. Standish, district manager of United States Tire Co.; H. M. Jewett, president Paige-Detroit Motor Car Co.; Alvan Macauley, vice-president, H. H. Hillis, general sales manager, Frank G. Eastman, advertising manager, and L. D. Robertson, manager Detroit branch of the Packard Motor Car Co., and Julian C. Weed, of the Timken-Detroit Axle Co.

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"Greater Garage Service," by Harry Salvat, Proprietor, Fashion Auto Garage, 51st Street & Cottage Grove Avenue, Chicago, Ill.

"The Relation of Tires to Electric Vehicle Efficiency," by S. V. Norton, Manager, Truck Tire Sales Dept., B. F. Goodrich Co., Akron, Ohio.

"Electric Truck Troubles and How to Minimize Them," by F. E. Whitney, General Manager, Commercial Truck Co. of America, 27th & Brown Streets, Philadelphia, Pa.

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REPRESENTATIVE BAILEY WANTS THE UNITED STATES TO PRODUCE GASOLINE

Representative Warren Worth Bailey, of Johnstown, Pa., has a plan for solving the gasoline problem, as far as price is concerned. The plan is to have the Federal government at once enter the producing field. Mr. Bailey's bill authorizes and empowers the Secretary of the Interior to sink wells on property owned by the government wherever advisable, with a view to producing oil, and also authorizes the Secretary of the Interior to promptly put the product on the open market, giving preference in selling to independent refiners.

He states that the Secretary of the Interior already has authority, under certain conditions, to enter into contract with private concerns for the refinement of the crude oil produced on lands included in the public domain.

Mr. Bailey also states that he thought it would not be necessary for the government to go into the oil producing business; that an intimation to do so would bring about the reduction in price of gasoline very quickly.

Hyatt Roller Bearing Co. has opened a branch in Seattle, Wash. The starting of the new branch is in charge of D. B. Bevier, formerly service manager of the company's branch at Los Angeles. F. B. Brunton has been made manager of the San Francisco branch.

AD CLUB TO HAVE HORSELESS PARADE

On Monday evening, June 26, during the Twelfth Annual Convention of the Associated Advertising Clubs of the World, will be held the greatest pageant Philadelphia has ever known. There will be no horses, (unless the accuracy of some of the historical part of the parade necessitates them) commercial cars taking their place. The first division will include floats and marchers representing the growth and development of advertising in Philadelphia. Following will be the clubs, all the marchers in costume or uniform. Floats from each city showing industrial progress, civic growth, and presenting that city's claims as a home for people and manufacture will be in line.

THE GASOLINE SITUATION IN GREAT BRITAIN

By OUR FOREIGN CORRESPONDENT

The condition of the gasoline market in Great Britain has lately given rise to a good deal of conjecture, and no little anxiety to the automobile trade. First the British Petroleum Co. announced that stocks were restricted and enjoined economy on motorists. Then the Anglo-American Co. retorted by publicly stating that as far as they were concerned there was no shortage of stock. Nevertheless, they raised their prices. In reply the Shell people raised theirs, but having done so, seemed unable to supply except in very restricted quantities. All over the country come reports that their motor spirit is not being supplied to the trade, and this shortage is certainly considerably greater than was foreshadowed by the British Petroleum Co.'s circular. The result is at present great uncertainty. Meanwhile, their published gasoline prices range from $.52 to $.58, while the Anglo-American gasoline varies from $.56 to $.60 according to grade.*

During this trade development, the British Government published an appeal to motorists throughout the Kingdom not to use their cars for pleasure motoring, and the subject has been taken up from this point of view by the Royal Automobile Club and various other bodies who have publicly asked private motorists to restrict the use of their cars to work helpful to the country—taking wounded soldiers out for airings and performing transport and service work for the Government. In these manifestos it is further pointed out that much of the shortage is due to the scarcity of gasoline tins, for many motorists, fearing a shortage, have consistently for a long time past laid in stocks and hoarded these cans; consequently, distribution has been hindered.**

In the commercial car side of the business, bonuses are suggested for drivers who show good consumption results, and in the trade there is likely to be something doing in devices for regulating additional air supply, and in kerosene and heavy fuel carburetors and vaporizers.

All the manifestos point out that commercial transport should have the precedence over merely private car work, and suggest that demand should be supplied in proportion to the national utility and the work required, but all only appeal to voluntary effort. There is talk, however, of all private car owners being individually restricted by government action to an allowance of gasoline, by cards similar to those at present in vogue in Germany for the distribution of bread, while there are even further rumors that for them the supply may be stopped altogether, and the use of gasoline confined to commercial car users and the Government services.

The exact position of the gasoline supply to Great Britain is indeed very obscure; only the Government is in possession of the real facts, but there is an undoubted shortage, although at present it is not serious enough to forbid, or even to necessitate regulation by law.

* The price here referred to is measured in Imperial gals., 1 Imperial gal. being equal to 1.20032 U. S. gals.; therefore the prices our correspondent mentions would be, respectively $.43 1-3, $.48 1-3, $.46 2-3 and $.50—Editor.

** In Great Britain gasoline or petrol, as it is called there, is dispensed in "tins," or square cans, not loose or in bulk as in this country. Our understanding of the matter is that the tins are filled and soldered up by the refiners, sold to dealers, and finally to the consumers. Old tins are returned in exchange for new filled ones.—Editor.

MERCHANT & EVANS COMPANY CELEBRATES FIFTIETH ANNIVERSARY

The Fiftieth Anniversary of the Merchant & Evans Co., Philadelphia, has just been celebrated, and the company has completed the removal of its general offices and warehouses to the new building erected adjoining its works on Washington Ave., between 20th & 21st Sts. It has plants in Philadelphia, Wheeling and Chicago; and offices and warehouses in Philadelphia, New York, Baltimore, Cleveland, Chicago and Kansas City. Added to the extensive line of metal products the company also handles automobile clutches, alignment joints, rear axles, jackshafts, transmissions, grease cups, metal tire cases and completely erected gasoline motor trucks and tractors.

EDWIN R. HALL DEAD

Edwin R. Hall, a councilor of the S. A. E., died on March 17th of pneumonia, at the age of 31 years. He was graduated in 1908 from the Massachusetts Institute of Technology and became associated with the Goodyear Tire & Rubber Co. in the same year. In 1909 he was made chief of the Goodyear experimental and specification department, which position he held until his death. He became a member of the Society of Automobile Engineers in 1911 and in 1915 served as chairman of the pleasure car wheels division of the Standards Committee. At the summer meeting in 1914 he presented papers on the pneumatic tire rim standardization that embodied a comprehensive summary of both British and American practices.

W. A. Clare has become general sales manager of the Atterbury Motor Car Co., Buffalo, N. Y., and will have charge of sales and advertising. He has been in the automobile business for 10 years.

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Hyatt Roller Bearing Co. has opened a branch in Seattle, Wash. The starting of the new branch is in charge of D. B. Bevier, formerly service manager of the company's branch at Los Angeles. F. B. Brunton has been made manager of the San Francisco branch.

AD CLUB TO HAVE HORSELESS PARADE

On Monday evening, June 26, during the Twelfth Annual Convention of the Associated Advertising Clubs of the World, will be held the greatest pageant Philadelphia has ever known. There will be no horses, (unless the accuracy of some of the historical part of the parade necessitates them) commercial cars taking their place. The first division will include floats and marchers representing the growth and development of advertising in Philadelphia. Following will be the clubs, all the marchers in costume or uniform. Floats from each city showing industrial progress, civic growth, and presenting that city's claims as a home for people and manufacture will be in line.

THE GASOLINE SITUATION IN GREAT BRITAIN

By OUR FOREIGN CORRESPONDENT

The condition of the gasoline market in Great Britain has lately given rise to a good deal of conjecture, and no little anxiety to the automobile trade. First the British Petroleum Co. announced that stocks were restricted and enjoined economy on motorists. Then the Anglo-American Co. retorted by publicly stating that as far as they were concerned there was no shortage of stock. Nevertheless, they raised their prices. In reply the Shell people raised theirs, but having done so, seemed unable to supply except in very restricted quantities. All over the country come reports that their motor spirit is not being supplied to the trade, and this shortage is certainly considerably greater than was foreshadowed by the British Petroleum Co.'s circular. The result is at present great uncertainty. Meanwhile, their published gasoline prices range from $.52 to $.58, while the Anglo-American gasoline varies from $.56 to $.60 according to grade.*

During this trade development, the British Government published an appeal to motorists throughout the Kingdom not to use their cars for pleasure motoring, and the subject has been taken up from this point of view by the Royal Automobile Club and various other bodies who have publicly asked private motorists to restrict the use of their cars to work helpful to the country—taking wounded soldiers out for airings and performing transport and service work for the Government. In these manifestos it is further pointed out that much of the shortage is due to the scarcity of gasoline tins, for many motorists, fearing a shortage, have consistently for a long time past laid in stocks and hoarded these cans; consequently, distribution has been hindered.**

* The price here referred to is measured in Imperial gals., 1 Imperial gal. being equal to 1.20032 U. S. gals.; therefore the prices our correspondent mentions would be, respectively $.43 1-3, $.48 1-3, $.46 2-3 and $.50—Editor.

** In Great Britain gasoline or petrol, as it is called there, is dispensed in "tins," or square cans, not loose or in bulk as in this country. Our understanding of the matter is that the tins are filled and soldered up by the refiners, sold to dealers, and finally to the consumers. Old tins are returned in exchange for new filled ones.—Editor.

In the commercial car side of the business, bonuses are suggested for drivers who show good consumption results, and in the trade there is likely to be something doing in devices for regulating additional air supply, and in kerosene and heavy fuel carburetors and vaporizers.

All the manifestos point out that commercial transport should have the precedence over merely private car work, and suggest that demand should be supplied in proportion to the national utility and the work required, but all only appeal to voluntary effort. There is talk, however, of all private car owners being individually restricted by government action to an allowance of gasoline, by cards similar to those at present in vogue in Germany for the distribution of bread, while there are even further rumors that for them the supply may be stopped altogether, and the use of gasoline confined to commercial car users and the Government services.

The exact position of the gasoline supply to Great Britain is indeed very obscure; only the Government is in possession of the real facts, but there is an undoubted shortage, although at present it is not serious enough to forbid, or even to necessitate regulation by law.

MERCHANT & EVANS COMPANY CELEBRATES FIFTIETH ANNIVERSARY

The Fiftieth Anniversary of the Merchant & Evans Co., Philadelphia, has just been celebrated, and the company has completed the removal of its general offices and warehouses to the new building erected adjoining its works on Washington Ave., between 20th & 21st Sts. It has plants in Philadelphia, Wheeling and Chicago; and offices and warehouses in Philadelphia, New York, Baltimore, Cleveland, Chicago and Kansas City. Added to the extensive line of metal products the company also handles automobile clutches, alignment joints, rear axles, jackshafts, transmissions, grease cups, metal tire cases and completely erected gasoline motor trucks and tractors.

EDWIN R. HALL DEAD

Edwin R. Hall, a councilor of the S. A. E., died on March 17th of pneumonia, at the age of 31 years. He was graduated in 1908 from the Massachusetts Institute of Technology and became associated with the Goodyear Tire & Rubber Co. in the same year. In 1909 he was made chief of the Goodyear experimental and specification department, which position he held until his death. He became a member of the Society of Automobile Engineers in 1911 and in 1915 served as chairman of the pleasure car wheels division of the Standards Committee. At the summer meeting in 1914 he presented papers on the pneumatic tire rim standardization that embodied a comprehensive summary of both British and American practices.

W. A. Clare has become general sales manager of the Atterbury Motor Car Co., Buffalo, N. Y., and will have charge of sales and advertising. He has been in the automobile business for 10 years.

The CCJ leads in circulation, advertising and prestige

Personal Items

H. B. Rathbone has become manager of the San Francisco branch of the Burd High Compression Ring Co., succeeding Robert Allan, resigned.

Walter Lee Taylor, president and general manager of the Keystone Spring Works, Philadelphia, Pa., died on March 19th at the age of 39 years.

James A. Carn, Jr., formerly with the Etude Magazine and the Philadelphia Press, has been appointed advertising manager of the Hudford Co. of Philadelphia.

A. C. Preston, formerly with the Gahran-Pinchbeck Co., Albany, N. Y., has become connected with the Burd High Compression Ring Co., and will represent that company in the Albany territory.

W. L. Van De Wielde, formerly truck factory representative of the Garford Motor Truck Co., has become district sales manager for the New England states for the Brockway Motor Truck Co.

G. H. Williamson, formerly district manager of the Maxwell Motor Car Co., has become affiliated with the sales department of the Four Wheel Drive Auto Co., Clintonville, Wis.

O. B. Henderson, Los Angeles, Cal., manager and vice-president of the Pacific Kissel Kar branch, has retired, and has been succeeded by C. L. Hewes, formerly of the Oakland Pacific Kissel Kar branch.

J. B. Blieler, formerly vice-president of the Overman Cushion Tire Co. and for some years connected with the Diamond-Goodrich organization, has become manager of the solid truck tire department of the Miller Rubber Co., Akron, Ohio.

R. J. Goldie has become factory manager of the Columbia Axle Co., Cleveland, Ohio. For the past two years he has been works manager of the Metal Products Co., Timken-Detroit Axle Co., and has been connected with the automobile manufacturing business for the last ten years.

Hoover Steel Ball Co., Ann Arbor, Mich., will erect new buildings comprising 42,000 sq. ft. of floor space, and will thus practically double the entire plant. The new buildings will be ready for occupancy by October 1st, and will be fitted with modern machinery and equipment. When this machinery is installed there will be a production of from 25,000,000 to 30,000,000 balls per day.

Argo Motor Co., Jackson, Mich., has been sold by the Briscoe Motor Corp. to Mansell Hackett, formerly manager of the Disco Starter Co., of Detroit. He will take immediate charge of the Argo Co., bringing a new organization to it, extending its activities, and continuing the present Argo models for the time being. A light delivery car will also be built on the same chassis. The Briscoe Corp. will devote its entire time to the manufacture and sale of Briscoe cars exclusively.

The Goodyear letter service which was inaugurated by the Goodyear Tire & Rubber Co. some time ago, has been so favorably taken by the dealers that the installation of large additional equipment in the Goodyear multigraphing and addressing department has been imperative. The dealer selects a series of letters from a large number submitted covering a variety of conditions, and supplies a mailing list of prospective customers. The letters are written on special stationery and sent to the dealer with envelopes addressed and stamped ready for him to sign and mail.

New Truck Agencies

Germain, George A., Winnebago, Minn., has taken Gary truck agency.

Cohen-Dallenbach, Ellwood City, Pa., has secured the agency for the Vim motor truck.

Wheeling Motor Car Co., Wheeling, W. Va., has taken the agency for the Sheridan delivery car.

Moss & Metcalf, Kansas City, Mo., have taken the agency for the Vim. They also handle the Indiana truck.

Rivers-Andrews Motor Co., San Francisco, Cal., has been appointed Pacific Coast distributor for the Brockway trucks.

Thomas A. Cooper, 211 Main Street, Toledo, Ohio, has formed a company to handle auto trucks, warehouse trucks, etc.

Thompson, J. E., & F. A. Clark, Huntington, W. Va., have formed a partnership to handle the Vim. A new garage and service station is being erected at 749 Third Avenue, which will be up-to-date in every particular.

Manhattan Motors Corporation, 56th Street & Broadway, New York City, has taken the agencies for the Vim and Selden line of trucks. Its territory includes Westchester and Rockland Counties, Long Island, Staten Island and five counties in New Jersey. E. F. Miltenberger is president of the new company and Howard W. Walton is a member of the sales organization.

Four Wheel Drive Auto Co., Clintonville, Wis., has recently appointed the following dealers: Miller, Earle & Miller, Chicago, Ill.; Motor Sales & Supply Co., Youngstown, Ohio; Motor Truck Sales Co., New Haven, Conn.; Four Wheel Drive Truck Co., San Francisco, Cal.; Four Wheel Drive Truck Co., Los Angeles, Cal.; Joe Nelligan, Santa Rosa, Cal.; Felix Geiger, Bakersfield, Cal.

H. J. Koehler S. G. Co., Newark, N. J., has recently added the following agencies: H. V. Anderson, Cotuit, Mass.; Charles Hubbard, Warren, Pa.; M. I. Bare, Bernville, Pa.; Terminal Motor Co., Richmond, Va.; C. M. Ferguson, Atlanta, Ga.; Humphrey & Brennan, Kingstown, Pa.; Williams Garage, Columbus, Ind.; V. J. Eckburg, Worcester, Mass.; F. D. Wilcox, Deposit, N. Y., and S. H. Daddow, St. Clair, Pa.

Denby Motor Truck Co., Detroit, Mich., has recently appointed the following dealers: J. D. McIntyre, 20 Green Street, Cambridge, Mass.; Ledger Lemoine, North Adams, Mass.; Denby New England Sales Co., 248 Boylston Street, Boston, Mass.; Ramsburg's Auto Supply Co., Winchester, Va.; Bunnell's Auto Sales Co., Hammond, Ind.; C. E. & A. P. Cobb, Denmark, Me.; E. H. Parsons & Son, Lyndonville, N. Y.; J. W. Driver, Newport News, Va.; Edward L. Caseman, Pekin, N. Y.; Motor Sales Corporation, 41 South Main Street, Logan, Utah.

Knickerbocker Motor Truck Mfg. Co., 151st Street & River Avenue, New York City, has taken the agency for the Stegeman truck, covering the territory of twenty-three counties within a 75-mile radius of New York City. The Knickerbocker Company will continue to manufacture its 5-ton four-cylinder chain drive truck and will also enlarge its service department for all classes of automobile work. Herbert H. Murden, general manager and engineer, will also assume the duties of sales manager, and Richard V. Brady will continue as purchasing agent.

Packard Motor Car Co., Detroit, Mich., reports that orders calling for trucks during the month of March amounted to $1,000,529.75. This represents domestic orders only; not a foreign order is included in this total.

New Incorporations

Economy Motor Co., Tiffin, Ohio, has been organized to manufacture light trucks. Among the organizers are: Raymond W. Miller, John A. Manacke and George E. Schroth.

Roto Motor Car Co., Hannibal, Mo., has been organized by the officials of the Hannibal Wagon Co. to make and sell a half-ton truck equipped with body. The wagon company is to go out of existence.

People's Engine Produce Co., Dover, Del., has been formed with a capital of $4,000,000 to manufacture, produce and refine petroleum, gasoline gas and lubricating oils. The incorporators are: H. C. Footh, Pittsburgh, Pa.; H. C. Swann, Bellevue, Pa., and R. Robbins, Crafton, Pa.

Day-Elder Motors Co., manufacturer of motor trucks with temporary offices at Room 1207 Firemen's Bldg., Newark, N. J., expects to be located in its factory at 161-67 Ogden Street about April 15th, and to have the different units in for both the 1000-lb. and 2000-lb. trucks. The officers of the new company are: Charles P. Day, president; George A. Gemmer, vice-president, and Fred G. Elder, treasurer.

Gerlinger Motor Car Co., Portland, Ore., has secured a factory in Tacoma in which the Gersix 2½-ton truck will be manufactured. Production will start about April 1st. The entire production department for the first six months will be devoted to filling war orders. The Gerlinger Motor Car Co. will continue in Portland, where a branch will be maintained to handle Federal and Menominee trucks and Pathfinder and Hollier Eight pleasure cars.

Clyde Motor Truck Co. was recently incorporated in Delaware with a capitalization of $750,000, of which $250,000 is preferred and the balance common stock. A plant has been secured in Long Island City, and it is expected that deliveries will commence in July. The company will assemble a 1-ton, $1,000 truck exclusively. The officers are: M. C. Schwartz, president; W. F. Melhuish, vice-president; John F. Mason, secretary, and E. E. Vreeland, treasurer.

A newly formed tractor show circuit in charge of A. E. Hildebrand, of Omaha, has been decided upon. This circuit will embrace seven or eight cities of the best agricultural sections of the Northwest. When the tractor demonstrations were held in Fremont, Neb., last year, nearly 50,000 people attended. Omaha will probably be one of the first cities selected for one of the demonstrations.

Chase Motor Truck Co., Syracuse, N. Y., at a meeting on April 7th submitted a report showing that up to April 1st, the company had on its books and unfilled orders amounting to $301,414.04 represented by business for domestic shipment. The March business booked by the company was the largest single month's business in the ten years' history of the company. The schedule outlined up to and including June 1st was practically contracted for by March 1st.

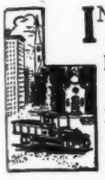
United States Rubber Co., New York City, at a recent meeting elected the following officers: S. P. Colt, president; J. B. Ford and Lester Leland, vice-presidents; R. B. Price, vice-president in charge of developing work; E. S. Williams, vice-president in charge of mechanical department; J. N. Gunn, assistant to the president; Samuel Morris, secretary; J. D. Carberry, assistant secretary; W. G. Parsons, treasurer, and E. J. Hathorne, assistant treasurer.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

"Cracked" Gasoline and the Rittman Process

With Description of the First Plant

By E. S. FOLJAMBE



IN view of the high price of gasoline, the various sources of this hydro-carbon fuel and the different methods by which it is produced, are of interest to the trade. This is particularly so, as it is now made known that the National Automobile Chamber of Commerce is planning to engage in the production of gasoline. Whether the N. A. C. C. actually become producers in quantity in the near future or not, this move on the part of the well known automobile manufacturers through their organization will be certain of producing results if merely of a moral nature, provided the present excessive price of gasoline is more or less due to manipulation.

A paper on this subject, which is concluded in this issue, would indicate that, although control of pipe lines and of oil production and the price of crude do exist by a group in the oil business, still there are deeper and more fundamental reasons for the increase in the retail price of gasoline.

The supply of crude itself is a limited thing, and although Dame Nature undoubtedly holds secret reserve supplies, still a canvass of the available sources by Government experts, reveals the fact that the supply from this country's resources alone will be exhausted within 40 to 60 years, even at our present rate of consumption, unless more efficient means of producing gasoline or of using less volatile products are devised.

New sources of supply, although they prolong the time, are more or less temporary in their nature. An inexorable law that the biggest gushers in the oil fields are of shortest life seems to prevail. In 1914, when the Cushing pool in Oklahoma produced 300,000 barrels of crude oil a day, it was looked upon as a menace, but by November, 1915, the decrease in price, due to this phenomenal producer, had disappeared and the crude oils had again risen to practically their former high prices, and producers and refiners alike were looking for new sources of supply. The discovery of new fields is daily growing more difficult.

Even if the crude could be supplied in unlimited quantities, its distillation for the production of gasoline results in an excess supply of less desirable products, part of the cost of which is, therefore, added to the price of gasoline. It follows that any means by which these less volatile products can be utilized, either directly in an engine or indirectly by "cracking" so as to produce gasoline from them, is now of particular interest.

The "Cracking" Process

This method of producing gasoline from crude oil or from kerosene or even from residue of distillation processes is not new, having been discovered in Newark, N. J., in the year 1861. It consists in heating oils to such a temperature that their heavy molecules decompose into lighter molecules with the consequent production of mixtures of lower boiling points. Here it must be said that with gasoline produced by the "cracking" process or with blended fuels, the range of boiling points is more of an indication of the character of the fuel than the Baume test. For years the buying public has considered this test as a sure indication of the grade of gasoline being purchased, and this is true of gasoline produced by straight distillation, but it is not true of blended fuels or of gasoline produced by the "cracking" process.

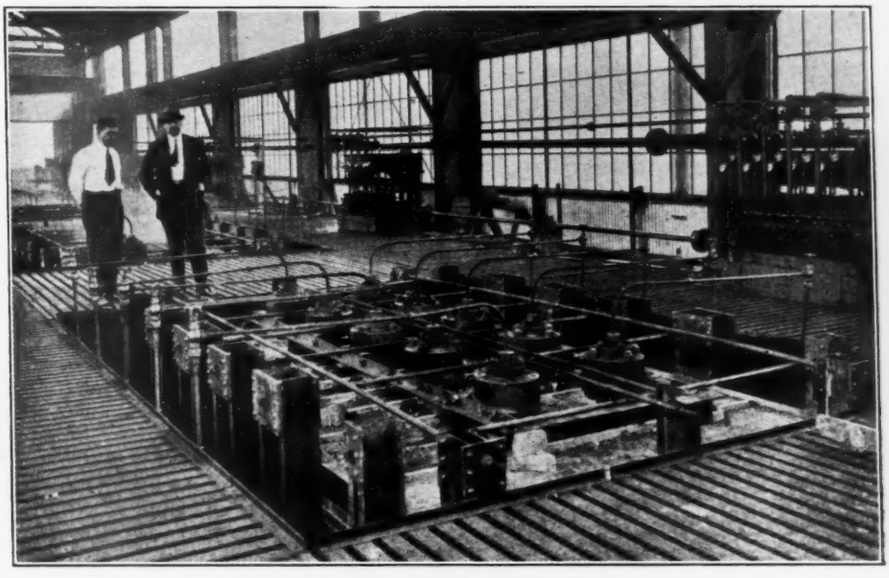
"Cracking" was first used for converting that fraction of crude petroleum intermediate between the burning or kerosene oils and the lubricating oils into liquid hydro-carbons suitable for use as illuminants. It follows the well known tendency of organic substances to decompose when heat is applied. The heavier the hydro-carbon molecule, the more easily it is dissociated.

The Burton process, owned and controlled by the Standard Oil Co., of Indiana, is the most generally known and used "cracking" method. If it had not been that this company introduced this process and thereby were enabled to recover more gasoline from a given quantity of crude, gasoline would today be selling for at least 5 cents higher, even as high as it now is.

The "cracking" process may be divided into three types, according to Government chemists, namely, those that involve "cracking" at atmospheric pressure, "cracking" under pressure in stills and large vessels and "cracking" under pressure in small vessels or tubes. The Rittman process comes under the last class, as tubes approximately 8 in. in diameter and 10 ft. long are used. It is an expensive process and, as far as we are able to find, no gasoline in commercial quantities has as yet been produced by this method. Under the contract with the Government, there are about 7 refiners who have put in experimental plants. The process has, however, been used for the production of "toluene" and the Rittman plant as employed for the production of "benzine-toluene" for explosives by the Aetna Explosives Co. is herewith briefly described. Before doing this, however, a word as to the theory of the process is in order.

Theory of Rittman Process

At normal temperatures and pressures, the molecules of any substance are found in a certain arrangement or state of equilibrium. This arrangement can be changed with changes of temperature and pressure. When crude petroleum is heated, a part of it undergoes a change of molecular arrangement and becomes a gas. The exact arrangement of the molecules of the portions of the crude in the gas endeavors by natural laws to be the same as in the crude oil. If, therefore, part of these gases are removed, as in the Rittman process, to a condensing chamber, the molecular arrangement of the remaining gases is destroyed. By introducing, in the gasified



Top of Tubes of First Rittman Plant
Dr. W. F. Rittman, in shirt sleeves, inspecting the first Rittman process plant for producing gasoline by "cracking" process from kerosene

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

fuel oil in the first step of his process a quantity of the gases found in the heavier hydro-carbon residue, Dr. Rittman, according to the National Petroleum News, is making use of this theory. As nature tries to arrange the molecules of the gasified fuel oil in such a manner as to bring about the same relationship between the light and heavy oils as found in the crude petroleum, it therefore tends to produce the lighter hydro-carbons, which in the Rittman process are constantly removed and condensed into gasoline or other light oils. The heavier gases are then constantly put back into the vapor obtained by the distillation of the original fuel oil or water hydro-carbon is used as the base of the process. This maintains an unnatural proportion between the gases and nature tries to overcome this by arranging the molecules of this freshly introduced gas into an arrangement similar to the molecules of the gases of the lighter oils.

In other words, nature assists the doctor in breaking up or cracking the large molecules of kerosene or crude into the smaller molecules of "cracked" gasoline.

Brief Description of Process and Plant

The plant consists essentially of a tube or, more correctly, a battery of 10 tubes passing through a brick furnace. The oil is introduced at the top of a tube, is gasified from the heat produced by a series of gas burners, 22 being used for a battery of 10 tubes, these burners being situated about half way up the height of the furnace. The flame plays entirely around the tubes. The gases then pass downward through a portion of the tube where the temperature is from 500 deg. C. (932 deg. F.) to 575 deg. C. (1067 deg. F.), and this is termed the "cracking zone." In this portion of the tube, the heavy hydro-carbons are broken up under the influence of, not only this high temperature, but also a pressure of 250 to 300 lbs. to the square inch, in the presence of hydrogen and fixed hydro-carbon gases.

After "cracking," the hydro-carbon gases, which are condensible and from which the gasoline is made, pass out through the bottom of the tube and into a condenser.

Diagram of Connections

In the accompanying diagram of the furnace connections, taken from Bureau of Mines, Bulletin 114, which described the process, is shown the "cracking" tube within the brick walls of the furnace in a vertical position. This particular furnace, as before stated, being used for the benzine-toluene process, has its tubes raised about 10 ft. above the ground, in order to place beneath a carbon pot or receptacle into which the carbon deposits fall. When producing gasoline by this process, practically no carbon is formed and the furnaces need not be elevated and the carbon pots can be eliminated. With the furnace shown, a vertical shaft, to which are attached a large number of small chains, is rotated within the cracking tube to dislodge and throw down the carbon deposit as it forms. These are known as stirring rods and may also be dispensed with. At the top of the diagram is the pump placed on the balcony floor and supplying crude oil or kerosene through an oil supply line to the top of the "cracking" tube, the oil being fed in the gasoline process at approximately 30 gallons per tube per hour. If the oil is preheated, a higher feed rate can be maintained. If the process is used in connection with an ordinary refinery, the oil could be taken direct from the run tanks after the gasoline had been taken off and pumped at once into the Rittman tubes while still hot, thus making for economy.

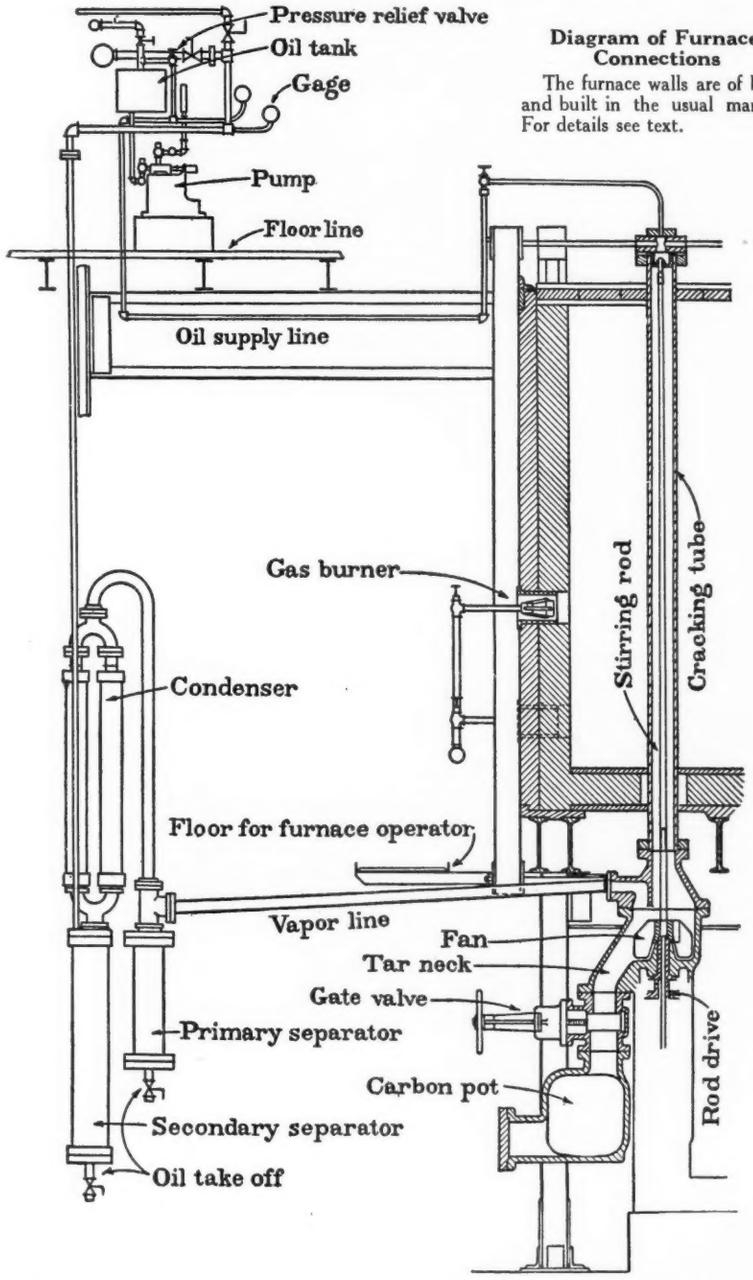


Diagram of Furnace Connections

The furnace walls are of brick and built in the usual manner. For details see text.

Characteristics of "Cracked" Gasoline

"Cracked" gasoline has been somewhat in disrepute, as it is said to have a disagreeable odor, causes carbon deposits and burns more slowly than straight distillate.

The carbon deposits, however, are claimed by Dr. Rittman to be due to improper combustion, because the nature of the product is unknown to the public and carburetors are not properly adjusted for its use, and furthermore, that the slow burning quality gives a continued pressure during the entire working stroke of the piston, resulting in an increased mean effective pressure. The disagreeable odor can also be eliminated by the use of liberal quantities of acid during production. The claim is also made that a blend of cracked gasoline and straight distillate gasoline may give even better results than ordinary gasoline, although the blend will not show a gravity test of more than 52 Baume. The Pittsburgh Laboratory of the Bureau of Mines is now working on this problem.

Increasing demand for gasoline will probably make it necessary for the user to take "cracked" gasoline, whether he desires it or not.

On a basis of heating value, this product is equal to any, and, therefore, when properly burned or exploded in the cylinders of an engine, should give an equal performance to ordinary gasoline.

The CCJ has most readers because it gives most information

Question and Answer Department

PERCENTAGES OF DIFFERENT TYPES OF FINAL DRIVES ON 1916 TRUCKS

To the Editor:

I would like to know the number of trucks to be made during 1916 using each of the various forms of final drive.

Buffalo, N. Y. J. M. J.

The tables below will give you this information in complete form. The cut shows graphically the percentage of different drives used in the different capacities.—Editor.

RUBBER TIRES BEST IF YOU CAN AFFORD THEM

To the Editor:

I have a 3-ton Avery truck, 1912 model, which is equipped with steel wheels. The roads in this country are pretty hard most of the year and have a good deal of rock. Do you think it advisable to change to rubber tires? I can do so at a cost of about $50, exclusive of the tires.

RAY C. WOOD.

Spearfish, S.D.

Rubber tires are one of the greatest savers of machinery that have ever been invented. It will, undoubtedly, result in longer life of both the chassis and the engine and if you can stand the expense I would by all means, equip the truck with rubber tires, particularly, as you say that the roads in your vicinity are somewhat rocky.

It might be advisable to take up the matter with the makers, asking their advice as to the best method of doing this, or what their experience has been in similar cases.—E. S. F.

Bureau of Standards Department, United States Government, has issued a pamphlet describing the properties of the non-expansible alloy Invar and other nickel steels. The publication is Circular No. 58, entitled "Invar and Related Nickel Steels." Copies will be sent free to interested persons upon application to the Bureau of Standards, Washington, D. C.

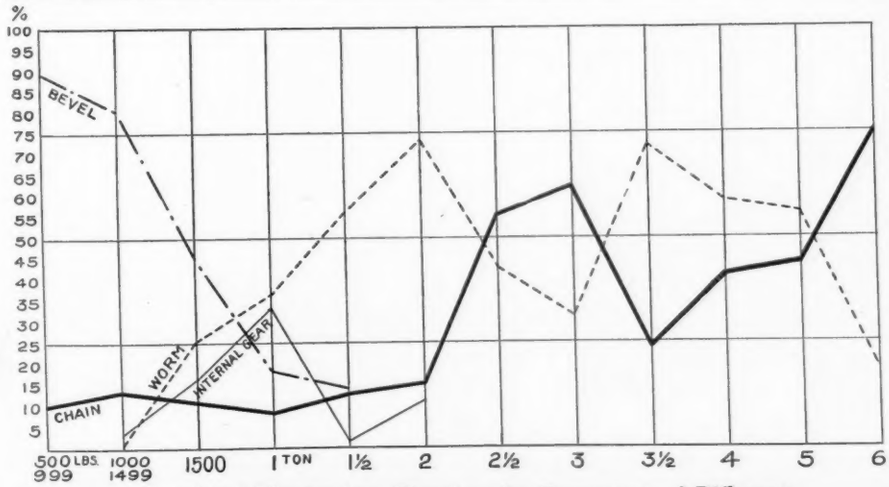
TABLE SHOWING NUMBER AND PER CENT OF EACH TYPE OF FINAL DRIVE ON 1916 TRUCKS

Number

Capacity	Chain	Worm	Bevel	Internal Gear	Double Reduction	Totals
500 to 999 lbs.	650	....	5,700	....	....	6,350
1000 to 1499 lbs.	2,500	350	14,795	500	....	18,155
1500 lbs.	970	2,025	3,615	1,285	....	7,895
1 Ton	1,230	4,960	2,600	4,585	....	13,375
1½ Tons	1,417	6,075	1,500	150	1,500	10,642
2 Tons	2,149	10,421	....	1,640	....	14,210
2½ Tons	800	640	....	....	....	1,440
3 Tons	4,202	2,098	....	455	....	6,755
3½ Tons	982	2,623	....	....	....	3,605
4 Tons	742	1,043	....	....	....	1,785
5 Tons	2,193	2,840	....	....	....	5,033
6 Tons and Over	388	100	....	25	....	513
Totals	18,233	33,175	28,210	8,640	1,500	91,804

Percentage

	Chain	Worm	Bevel	Internal Gear	Double Reduction
500 to 999 lbs.	10.2	....	89.8	....	....
1000 to 1499 lbs.	13.7	1.9	81.4	2.7	....
1500 lbs.	11.0	25.6	45.8	16.2	....
1 Ton	9.2	37.1	19.4	34.2	....
1½ Tons	13.3	57.1	14.1	1.4	14.2
2 Tons	15.1	73.3	....	11.5	....
2½ Tons	55.5	44.5	....	....	....
3 Tons	62.2	31.0	....	6.7	....
3½ Tons	24.3	72.8	....	....	....
4 Tons	41.6	58.4	....	....	....
5 Tons	43.6	56.5	....	....	....
6 Tons and Over	75.7	19.5	....	4.9	....
Totals	20.3	36.9	30.7	9.6	2.5



A Graphical Illustration, Showing the Percentage of Different Drives Used on Various Capacities

HOW PIPE LINES AFFECT THE FUEL SITUATION

The recent Federal Trade Commission report on the pipe line situation brings sharply to view the fact that the independent oil men of this country are at considerable disadvantage, due to the loss of pipe line transportation enjoyed by the Standard Oil, while the independents have to use the railroads for crude oil shipments. The Commission recommended lower pipe line rates and smaller minimum shipments, to make the lines available to the smaller concerns.

The Commission investigated only the Mid-west pipe lines, but is now investigating those east of the Mississippi.

The report shows that the Standard Oil Co. when piping oil from the Cushing field in Oklahoma, has an advantage of ¾ cents a gallon by the time it has reached Kansas City; that at Whiting, Ind., they have an average of more than a cent a gallon; by the time the oil has reached Buffalo this has become 1¾ cents, while at the Atlantic Coast it is anywhere from 2 cents to 2¼ cents a gallon. In other words, they get the crude oil to the coast at 2¼ cents a gallon less for transportation than the independent refiners, who must use the railroads.

The report says: "Pipe lines are as fundamental a factor for the oil industry as are the railroads for agriculture. There is no possibility, therefore, of any satisfactory solution of the problems affecting the oil industry as long as the common carrier service of pipe lines is not performed under reasonable and equitable terms. Furthermore, the statement may be ventured that if these problems are once correctly solved, the other problems of the oil industry will present not only less difficulty, but also less danger."

According to the National Petroleum News, the cost of transporting a barrel of oil from the Cushing pool in Oklahoma to Whiting, Ind., the location of the Standard's big refiners, is 11 cents, including depreciation, or, including 6 per cent. interest, 14½ cents a barrel against the railroad rates for the 697 miles of 62 cents a barrel.

The conclusion is evident, says the report, that lower rates and equitable shipping requirements by pipe line are necessary in order to make pipe lines common carriers in fact as well as in law, and that the prosperity and perhaps even the existence of many small concerns are dependent upon reasonable and equitable shipping conditions.

The Committee on Industrial Preparedness of the Naval Consulting Board has opened headquarters at the Engineering Societies Bldg., New York City, and steps have been taken to gather data from all the companies capable of making munitions or war materials. Boards will be formed in each state, with one representative each of the national civil, mining, mechanical, electrical and chemical engineering societies, and the 30,000 engineers belonging to these societies will work under these boards.

The Associated Advertising Clubs of the World will support the work of the committee and inaugurate a campaign commensurate in quality and power with the work done by the engineers.

The CCJ has most advertisers because it gives them biggest returns

Commercial Cars Transport Food and Ammunition to United States Troops in Mexico

Army Mule Outdistanced in Every Way by Motor Rival. Truck Squads Protect Line of Communication Between Permanent Base and Field Base

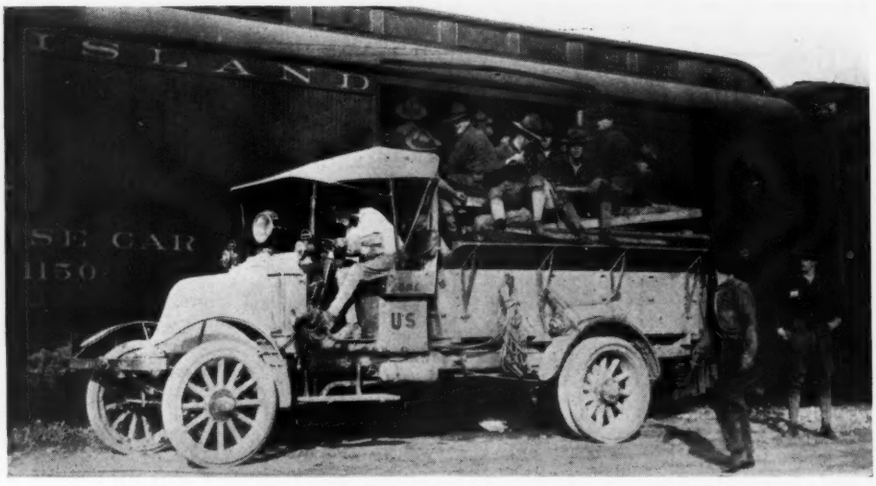
MOTOR trucks are playing an all-important part in the American punitive expedition which has been occupying Mexican soil for some weeks past. Since the field base is hourly being pushed further away from the base of supplies at Columbus, N. M., the problem of keeping up communication with this base is a most important one and is being splendidly solved by the commercial car transport.

This is the first time in actual American war service that the motor truck and the army mule have been pitted against each other under the worst conditions to be encountered in military service. And those who have observed the work of both mule and motor freely assert that the present campaign in Mexico is the last stand of the army mule. The 200 trucks now in the field are receiving the most severe tryout ever given an American made machine.

The first week of actual service revealed the superiority of trucks over mules, not only in the greater speed and running radius of the trucks, but in the reduction of labor, hauling units, forage requirements and cost of operation.

For transport work, the war department has formed several units known as "motor truck companies," each consisting of 27 trucks for hauling and one repair truck, all in charge of a truck-master having three assistants, 28 drivers, one mechanic, one mechanic's helper and one machinist.

Jeffery "Quad" Shipment of Twenty-eight Trucks for United States Army to Mexican Border



A Lippard-Stewart Truck Hauling Provisions to the Soldiers in Camp on the Border

Fleet of White Army Trucks at Columbus, Loaded With Rations for General Pershing's Field Force

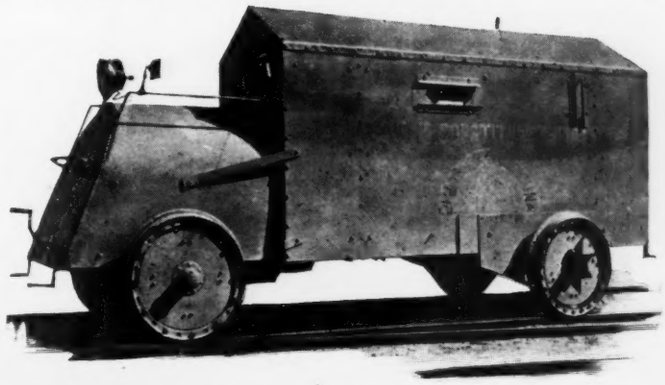
The CCJ leads in circulation, advertising and prestige

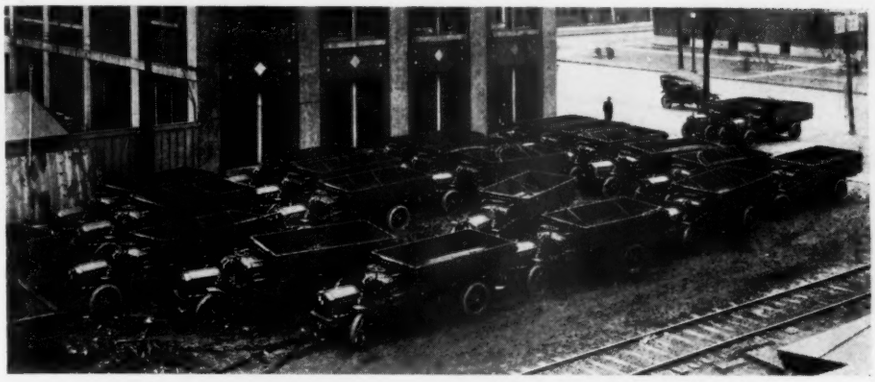
The greatest difficulty encountered by the machines is on the road or more practically speaking the "trail," which lies over the rough desert of northern Mexico. It has been so chopped up by the passage of cavalry and trucks that it now resembles a sand pit more than a highway. Speed is not possible under these conditions and a 10-mile average is considered fast by the army truck operators.

There are no armored trucks in service as it would be impossible for these to combat with the roads, as the load would be too heavy.

Armored Motor Truck Used by Villa

Photo shows the armored motor truck used by Villa, which is patterned after the war cars used in the service of the Russian, French and German armies. The interior of the armored body carries ammunition and rifles and port holes allow the machine guns to spit their deadly stream of bullets.





Twenty-three Packards, Part of Second Mexican Order, Waiting for Freight Cars at Factory

Drinking Water Hauled by Tank Trucks

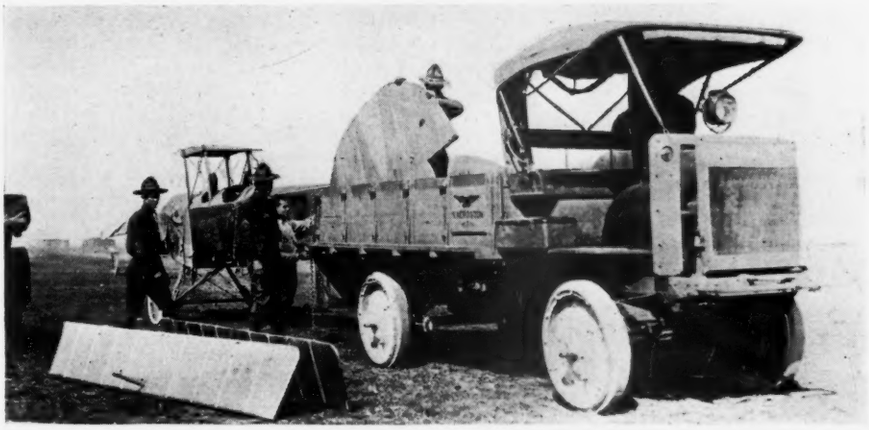
Many of the rivers, wells and water holes along the route of the army transport service are either polluted or poisoned, making it necessary to transport practically all the water used for drinking. For this purpose the war department is using three tank trucks of 600 gal. capacity each.

For 75 miles south of Columbus the route passes through only two villages, and these have been deserted. The only opportunity to replenish a water supply is offered by the roadside camps and kitchens which have been established along the route to enable the transport service to keep going night and day.

Truck Makers Break Delivery Records

Practically all of the truck makers that are sending trucks to Mexico have broken all speed records for prompt shipment.

Less than 22 hours after receiving instructions from the war department, a motor transport of 27 Packard trucks and 33 expert mechanics and chauffeurs left for the Mexican front to join General Funston's expedition into the Southern Republic.



The Wings of the Aeroplane Are Put in the Truck and the Body is Trailed by Its Tail Behind the Truck

Detail of Trucks Starting for the Front, With Gasoline and Supplies for Aviation Corps

The CCJ brings greatest returns to advertisers be cause of largest circulation among quantity buyers

Right Side of Packard Workshop Truck

This machine carries a lathe; power-driven forge; anvil; emery wheel; small tools; spare wheels; transmission; springs and other parts for emergency repair work.

In accordance with Packard "Preparedness Plans" a special emergency shift of mechanics reported for work during Monday night and assembled, tested and loaded 27 trucks in less than 20 hours.

AUTOS *VS.* FIELD RAILWAYS

By OUR FOREIGN CORRESPONDENT

An illuminating little example of the value of the commercial car was recently afforded during the big fight round Verdun. To bring up their enormous supplies of artillery, ammunition and men, the Germans had constructed numerous field railways, and there was no doubt about their effectiveness. These railways seemed to have given the Advisory Committee in France some little anxiety, and accordingly two members were despatched to inquire into the matter. The result of their research was that they were able to report that the French method of employing automobile convoys, organized on a huge scale, appeared to give decidedly superior results, owing to the greater direction-flexibility of this form of transport.

The Receiving Station and Anchorage of a French Observation Balloon

This oddly constructed motor car, illustrated below, with its two bodies, one running at right angles to the other, controls and acts as an anchorage to a French observation balloon. As the balloon rises, a small trolley unwinds from a reel. The balloonist transcribes his observations, places them in a tubular contrivance, which he clamps about the trolley, and sends it down to the receiving station. At the right of the photograph, a French officer is seen in the act of removing from the tubular carrier the message sent down from the man making his observations.

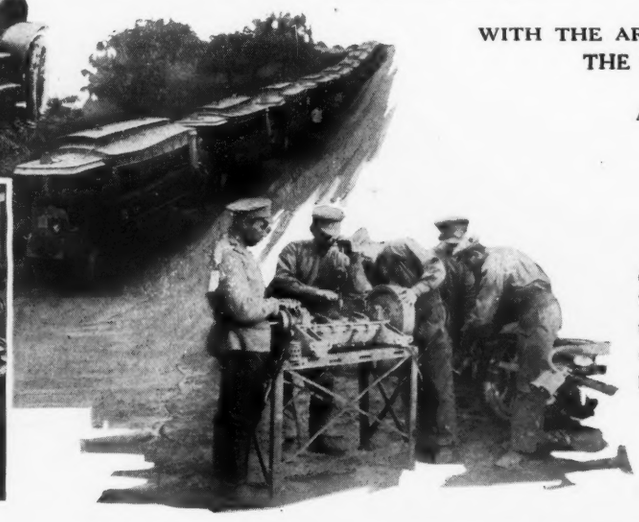
One of the "AB" Mack Armored Trucks Presented to the New York National Guard

This is one of the first units completed, of the 40 armored cars presented to the State of New York and built by the International Motor Company, West End Avenue and Sixty-Fourth Street, New York City. The chassis is a standard two-ton Model AB worm-drive Mack with steering and controls arranged very low, to allow the driver to sit very low, and make it possible for the guns to fire over his head. The armor plate used is a special heat-treated steel, that will resist the regulation army rifle at 50 yards. The armor plate weighs 2400 lbs., while the weight of the complete outfit is 9052 lbs. Entrance is by a door at the rear. Seven port holes are fitted, one on each side of driver's cab, two on each side of body and one in door at rear.

WITH THE ARMY ACROSS THE SEA

A convoy of stores on Paris motor 'buses

A view in one of the depots showing some of the motor transport of the Russian army receiving final adjustments previous to a trip.

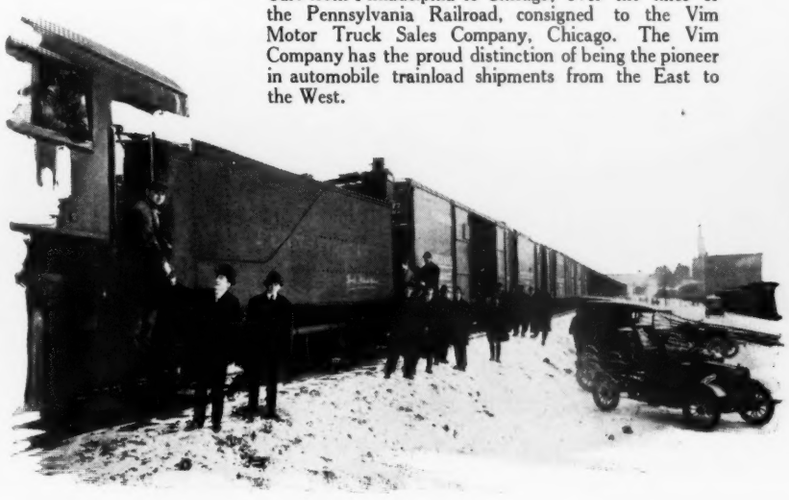


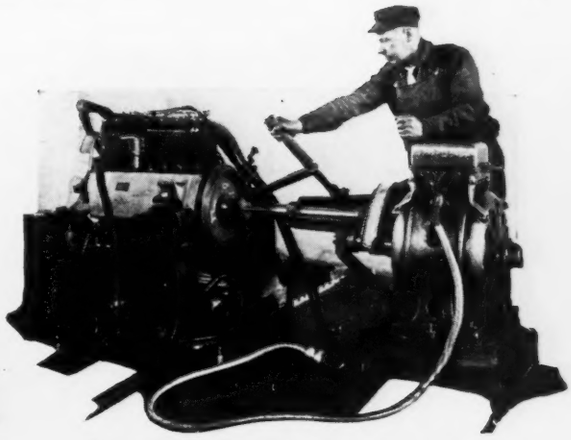
Scene in one of the repairing shops

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

A Trainload of Vims Going West

The Vim Motor Truck Company, of Philadelphia, Pa., recently shipped a complete trainload of Vim Delivery Cars from Philadelphia to Chicago, over the lines of the Pennsylvania Railroad, consigned to the Vim Motor Truck Sales Company, Chicago. The Vim Company has the proud distinction of being the pioneer in automobile trainload shipments from the East to the West.





Starting Continental Engines in the Testing Department

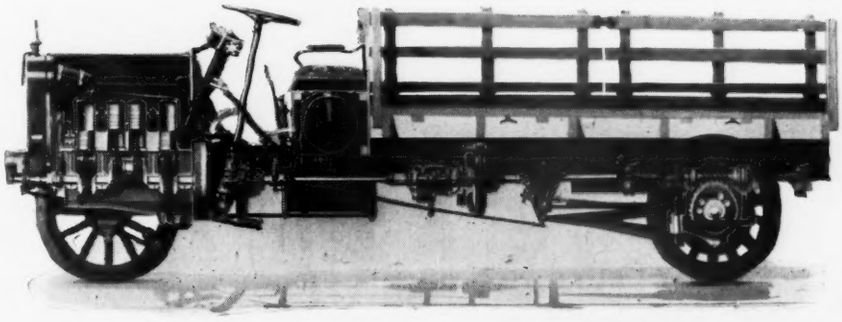
Hand cranking is no longer in vogue in the immense engine-testing department of the Continental Motors Company, of Detroit, Michigan. The very simple device shown makes it possible to start a row of two-hundred and fifty green motors in less time than it formerly took to start a dozen by hand, and one man does the work, where before it seldom took less than two men to a motor,

The starter, a large electric motor, is mounted on a small four-wheeled truck which runs on a track behind the motor-testing stands.

Chase Model O, Oil Delivery Truck

To meet the demand for a combination "oil delivery truck" the Chase Motor Truck Company, of Syracuse, N. Y., has designed and built the equipment as shown in the illustration to the right. For this purpose, the Chase Company has mounted on their standard stake-body construction, a steel oil tank which is removable. The tank is mounted on saddles and is fastened to the standard stake body by means of four tie bolts Hooks are attached to the tank supports, and when the tank body is to be removed chains are fastened to these hooks and the tank hoisted by means of a crane, leaving the stake body to be used to haul oil cans or barrels

The tank on this job has three compartments, which are used for kerosene, gasoline and heavy oil. The three compartments have a combined capacity of one thousand gallons. The truck shown in the photograph is equipped with the new Smith Metal Wheels.



Half of a Packard Truck

The Packard Motor Car Company has made it possible for the layman to get a grasp on the mechanical properties of its commercial vehicle products, by a photographic drawing, skilfully and scientifically "cut away", which reveals at a glance the innermost vitals of the Packard chainless truck. Nearly every important assembly is shown, both in nature of construction and in relation to the other assembly units which make the complete merchandise carrier. The illustration is being used with great success by the Packard selling force.

Knox Tractor Hauls a Fifteen and a Half Ton Girder

The above illustration depicts, in a startling way, the range of usefulness of the hard-worked gasoline motor. The steel girder measured 60 feet in length, 57 inches in width and weighed 15½ tons. A Knox tractor hauled this formidable load a distance of 3.2 miles to its destination, in exactly eighteen minutes, according to figures supplied by the motor transportation engineers who contracted for the hauling, E. T. Towar & Company, of Detroit, Michigan.

The CCJ has most readers because it gives most information

Steel and Rubber Markets

Steel Business Breaks Records

The first quarter of the year just closed witnessed the breaking of all records in steel buying. With production at a rate beyond the capacity of the mills, the volume of incoming business assures a continuance of full operations over all this year and a greater part of 1917. Although war trade at first induced an expansion of production, home trade is now paramount on the books of the mills. Quotations on April 10th were:

Steel Products Prices.

Bessemer billets, per ton, mill	45 00 a ....
Open hearth, per ton, mill	45 00 a ....
Sheet bars, per ton	45 00 a ....
Forging billets, per ton, mill	67 00 a ....

The above prices are at tidewater, in carloads and larger lots. For quantities less than 2,000 lbs., but not under 1,000 lbs., $2 per ton additional is charged, and less than 1,000 lbs., $8 per ton additional.

Sheets.

The following prices are for 100-bundle lots and over f.o.b. mill; smaller lots are $2 per ton higher:

Blue Annealed Sheets—	
Nos. 9 to 10	2 90 a 3 00
Nos. 11 and 12	2 95 a 3 00
Nos. 13 and 14	3 00 a 3 10
Nos. 15 and 16	3 10 a 3 20
Box Annealed Sheets, Cold Rolled—	
Nos. 22 and 24	2 70 a 2 75
Nos. 25 and 26	2 75 a 2 80
Galvanized Sheets of Black Sheet Gauge—	
Nos. 10 and 11	4 00 a 4 25
No. 12	4 10 a 4 35
Nos. 13 and 14	4 10 a 4 35
Nos. 15 and 16	4 20 a 4 45
Nos. 17 to 21	4 35 a 4 60
Nos. 22 and 24	4 55 a 4 80

Iron and Steel at Pittsburgh.

Bessemer iron, Valley furnace	21 00 a 21 50
Bessemer steel, f.o.b.	45 00 a ....
Skelp, grooved steel	2 30 a 2 40
Sheared steel skelp	2 40 a 2 50
Skelp, grooved iron	2 70 a 2 80
Sheared iron skelp	3 00 a 3 10
Ferro-manganese (80 per cent.) seaboard	175 00 a400 00
Steel, melting scrap	18 50 a ....
Steel bars (contracts)	2 75 a ....
Black sheets, 28-gauge	2 85 a 2 95
Galvanized sheets, 28-gauge	5 00 a 5 15
Blue annealed, 10-gauge	2 65 a 2 75
Tank plates, ¾ and heavier	3 50 a ....

Rubber Prices Decline

Since our last report the price of crude rubber has dropped a few points, and little interest is taken by consumers in the market. Manufacturers are purchasing in small or moderate lots. Quotations on April 10th were:

Para—Up-river, fine, per lb	74 a 75
Up-river, coarse	57 a ..
Island, fine	68 a ..
Island, coarse	37 a ..
Caucho, ball, upper	58½a ..
Caucho, ball, lower	56½a ..
Cameta	39 a 40
Ceylon—First latex, pale crepe	86 a ..
Brown crepe	84 a ..
Smoked sheets	85 a ..
Centrals—Corinto	55 a 56
Esmeralda	45½a ..
Guayule	.. a ..
Balata, sheets	70 a 71
Balata, block	48 a 56
African, Massai, red	.. a ..

Domestic Scrap Rubber.

Boots and shoes	11¼a ..
Tires—Automobile	6½a ..
Bicycle, pneumatic	3½a 3¾
Inner tubes, No. 1	29 a 30
Inner tubes, No. 2	11½a 12

NEW CHARGING STATION BOOKLET

A new electric automobile charging station booklet has just been published by The New York Electric Vehicle Association, Irving Place and 15th Street. It contains a complete list of all charging stations in New York City and within a radius of a hundred miles of City Hall, together with the maximum amperage and voltage available, the hours during which service is available and the prices charged for boosting at all of the stations listed. There are two route maps, one of New York City and the other of suburban runs with the charging stations shown. There is an interesting and instructive chapter on auxiliary charging or "boosting" with a table of constant current boosting rates.

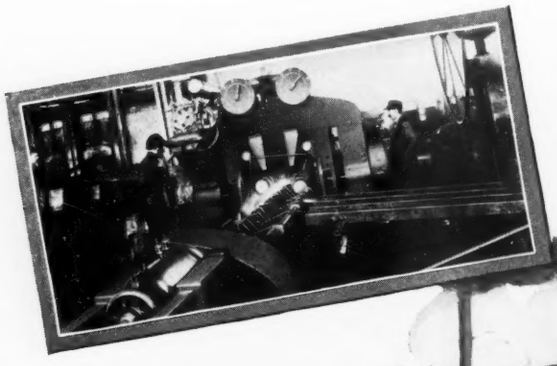
Autocar Sales & Service Co. will occupy garage being erected at 1307 Cathedral Street, Baltimore, Md.

The Koehler Model K four-cylinder 1-ton truck has been advanced in price to $955 complete with body, and the chassis to $940, f.o.b. Newark, N. J.

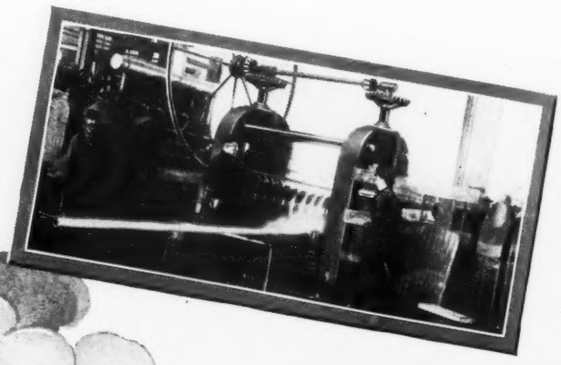
Burd High Compression Ring Co., Rockford, Ill., has opened an office at 899 Boylston Street, Boston, Mass., in charge of E. B. Allen, and has moved its Milwaukee office from 403 Jefferson Bldg. to 813 Grand Avenue, and the Seattle office from 538 Central Bldg. to 705 E. Pike Street.

Searchlight Co. of Chicago, maker of Searchlight acetylene, is sending out a folder to the trade in which dry and wet acetylene is described. The Searchlight Co. used a patented filler, the merits of which are that it insures dry acetylene thereby preventing any causes for sputtering of the acetylene flame. The company will gladly send a circular to anyone interested.

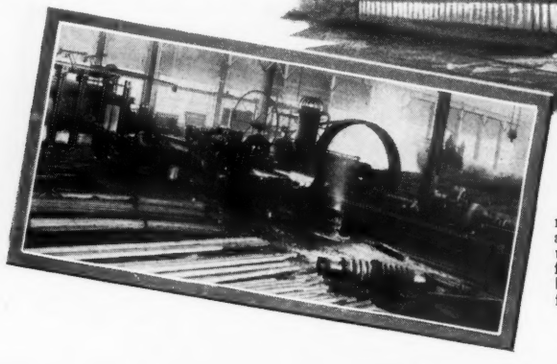
Where Timken Cup and Cone Stock is Produced



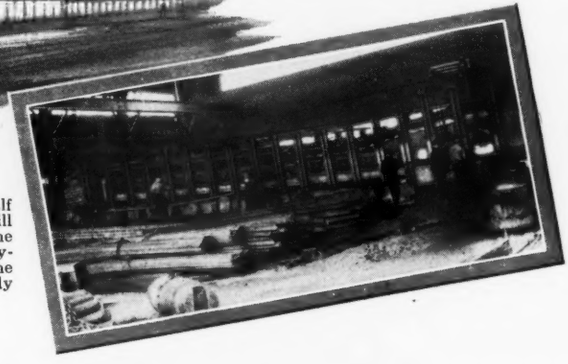
Above: The piercing mill pierces the white-hot billets with electric punch. Below: The "white hot" working department of the new mill.



Above: White-hot pierced billets being rolled into tubing of the size required for making cups and cones for Timken roller bearings.



Above: The new half million dollar tube mill at Canton, Ohio. To the right: The long, gravity-feed furnace heats the billets white hot, ready for the piercing mill.



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THE COMMERCIAL CAR JOURNAL

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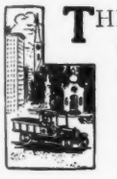
VALUE OF STANDARD PARTS AS SALES ARGUMENTS



THE manufacture of trucks is rapidly settling down to what may be termed a manufacturing basis. Competition is keen and the cost is watched very closely by competing makers.

Tried to Make Every Part

In the early days, everybody tried to make the entire vehicle, every part of it, but at the present time they are finding that it does not pay to make every part. This has been shown by the experience of more than one factory that has at least given up the manufacture of certain of the units which go into the construction, owing to the fact that they are unable to build equally good goods for the same money that they can buy them from a specialty maker, who makes a business of that particular part and doesn't manufacture anything else.

Advertises the Use of Standard Parts

So good have some of these parts become that their use in the truck is used as a sales argument by the selling force; in other words, the continuous and extended advertising of these parts and their worth has finally established them on the market as standard. Salesmen, realizing this, demand of the manufacturer that instead of making a part himself, which part has no particular standing on the market and is not known to the users, that they use standard parts, the mere mention of which conveys to the mind of the purchaser that the parts used are accepted as the best the market affords. So instead of being careful to cover up the fact that they are using parts made by other manufacturers in the construction of their vehicles, the truck makers today are advertising that they use standard parts, and their sales forces are using it as a sales argument.

MANY REASONS WHY FUEL IS HIGH—LOWER AND LOWER GRADES OF GASOLINE BEING USED IN TRUCKS—WHY NOT KEROSENE, AT A LOWER PRICE?

MOST of the writers on the fuel subject seem to take but one theme and dilate upon that, overlooking entirely other things which are perhaps just as much contributary causes; for example, one places it as purely arbitrary action on the part of the Standard Oil, another says it is entirely due to the War and exportation, while still another points to the increasing demand for gasoline and the fact that our fields are limited in extent. Others point out the tremendous waste attendant upon the production of gasoline and in its transportation from point to point.

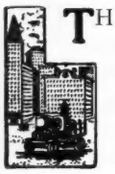
Any study of the fuel situation points to all of these things as contributary causes. But manipulation alone cannot be blamed. It is not doubted that the powers that be in the oil business have made use of the unusual demand abroad and at home and also of the fact that the supply of crude oil has been largely decreased since the cessation of the Cushing pools in Oklahoma to tack on a little additional price, but a deeper study shows that this is not the only cause for the high price of gasoline. Some wells are capped and a certain amount of crude is in storage, but according to Government reports consumption of gasoline, including exports, has increased in the last six months 27 per cent., while the output of crude in the same period has declined 16 per cent. The difference is being drawn from storage. It is believed the Rittman process and others which produce gasoline from kerosene and from lower grade oils, are going to be factors this coming year, but it does not pay to overlook the fact that the delivery of crude has exceeded the production at the wells.

There are, however, quantities of kerosene in storage in the country. The ordinary oil produces in the neighborhood of 22 per cent. of gasoline and about 45 per cent. kerosene. In other words, for every gallon of gasoline that is made, at least 2 gallons of kerosene are also made. This kerosene has to be stored to a large extent, because there is not sufficient market for it. Some of this cost of production and storage of kerosene is now being added to the price of gasoline. Use of this kerosene as a commercial car fuel is therefore going to supply at least in part a remedy of the present situation. Tractors starting on a small quantity of gasoline have been using kerosene as their fuel for several years. Many trucks throughout the West, in California, Arizona and New Mexico, are now, and have been for three years, running on distillate, a low grade fuel. These trucks are perfectly capable of burning ordinary commercial kerosene successfully. There is no reason why this should not be extended and why other

trucks throughout the country should not be able to use kerosene at a great saving in fuel costs and incidentally supplying a market for the by-product kerosene.

Cessation of hostilities abroad will undoubtedly bring down the price of gasoline again, but until that time, which may be even two or three years, with the supply to a certain extent limited, with the Russian and other foreign oils cut off, with the whole world looking to us for gasoline and naphthas, and with the new processes not yet producing, it will be several months, at least, before any remedial measures will probably show in the cost of fuel. The prevailing price, therefore, may be expected to remain very high during this summer, but, in all probability, will drop within six or eight months, but this does not mean that there is no necessity whatever for the automobile industry, and particularly for the truck makers, to meet the problem of burning the low grade fuels. Such fuel is even now being supplied under the name of gasoline. The manufacturers of trucks must look into the future and be prepared to burn not only low grade gasoline, but even straight kerosene.

SCARCITY IN THE PARTS MARKET CONTINUES. MANUFACTURERS ORDERING BY EXPRESS



THAT the truck business is rushing cannot be questioned. Trucks are being ordered in quantity and the manufacturers are pressed to the limit of their ability to turn them out fast enough. This does not apply to those supplying cars to Europe alone, but also to those supplying home trade. It also applies to the parts and accessory people catering to the truck business. These makers are working overtime in an almost vain endeavor to keep up to the demands of the complete car makers.

Many of the manufacturers are ordering special parts by express, in order to get them sooner. The habit is becoming quite prevalent in the truck business. Although the cost of this procedure is excessive, still it is less than tying up the entire plant or having to lay off men or hold them over, because of inability to get sufficient parts to keep up the production.

The chief disadvantage of this, aside from the added cost per truck, which is running as high as $25 to every $1000 of the selling price, is the fact that the parts makers, according to the complete car makers, take it for granted that just as soon as a manufacturer orders by freight, after formerly ordering by express, he is no longer in urgent need of parts and the parts are therefore sent to someone who has ordered them by express.

These, of course, are conditions which cannot exist for any great length of time and are not normal. They are adding extra expense to the cost of the vehicle, which, if the practice continues, will have to be added to the purchase price.

In the pleasure car field, a large number of the car makers have recently raised their prices, owing to their inability to get parts in quantities and also on account of the lack of material and the high cost of what they are able to get. Similar conditions exist in the truck business, but to a less degree, but if these methods of shipment and shortages continue to exist for any extended period, a slight increase in the price of trucks may be looked for, particularly if the war continues for another year.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

of Commercial Car Journal, Published Monthly at Philadelphia, Pa., for April 1, 1916

State of Pennsylvania,
County of Philadelphia, ss:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared James Artman, who, having been duly sworn according to law, deposes and says that he is the Editor of the COMMERCIAL CAR JOURNAL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:
   Publisher, CHILTON COMPANY, 49th & Market Sts., Philadelphia, Pa.
   Editor, James Artman, Narberth, Pa.
   Managing Editor, E. S. Foljambe, Drexel Hill, Pa.
   Business Manager, C. A. Musselman, 4203 Pine St., Phila., Pa.
2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total amount of stock.)
   James Artman, Narberth, Pa.
   George H. Buzby, 4412 Walnut St., Phila., Pa.
   C. A. Musselman, 4203 Pine St., Phila., Pa.
3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: None.
4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and that this affiant has no reason to believe that any other person, association, or corporation has any other interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JAMES ARTMAN, Editor.

Sworn and subscribed before me this 27th day of March, 1916.
(Seal) GEORGE H. SHEVLIN.
(My commission expires April 1, 1917.)
Form 3526.—Ed. 1916.

DENBY SECOND MONTHLY PRIZES AWARDED

R. S. Hillman, New Galilee, Pa., and Chas. B. Smith, Detroit, Mich., won first and second prizes respectively in the second month's contest for awards in the Denby Business-Building and Sales-Efficiency Course in Salesmanship.

It is interesting to know that Mr. Hillman won second prize in the first month's award and his place in the second month's awarding shows very commendable persistency. Mr. Hillman is a roof and furnace man. Mr. Smith drives a Denby truck for the Golden Storage & Cartage Co. of Detroit, and has shown much enthusiasm and interest in the course. The Denby Course continues until November, 1916, and the interest taken in it is resulting in a marked increase in efficiency in the various organizations which are taking advantage of this course.

SEPARATING THE CHIPS

In factories such as the Timken-David Brown Co., manufacturers of worm gearing for commercial cars, the separating of two dissimilar metals such as bronze and steel has been quite a problem. In this plant the chips thrown off by the cutters which cut the teeth in the bronze worm wheel are saved and re-melted. To get the highest market price for these bronze chips they must be clean and free from any other metal. As it is practically impossible to collect these bronze chips from the machines without getting a certain amount of steel chips at the same time, some method of classifying and separating these two dissimilar metals had to be devised.

This also occurs in factories which do considerable aluminum work. By a very clever system of electromagnets, scrap, which would ordinarily lose in value considerably by the mixture of foreign material, is now gone over carefully and the foreign matter, such as iron and steel, is automatically lifted out.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

The High Price of Gasoline, and the Automobile Fuel Situation

NOTE: This article is continued from our March issue, and forms part of the paper read by E. S. Foljambe, at the Metropolitan Section Meeting of the S.A.E. In this installment, various types of kerosene carburetors and kerosene-burning devices now on the market are described.

Methods Employed in Kerosene Carburetors

A special type of carburetor must be used. It may be necessary to heat the fuel in the carburetor or to heat the air so it will vaporize the kerosene more readily and prevent condensation. Direct heating of the fuel itself, if carried too far, has a tendency to preignite it, especially if close to the flash point, and also a tendency to cause it to separate into its various constituents, the most volatile passing over first, leaving undesirable residue in the carburetor.

Water Vapor Advantageous

The introduction of slight quantities of water vapor with the fuel is well known and has been experimented on for many years. Its beneficial effects are recognized and some device for this purpose should form a part of every carbureting mechanism. It slightly reduces cyclinder heat, delaying or prolonging the combustion, somewhat reduces the maximum cyclinder pressure while keeping up the expansion curve or increasing the mean effective pressure. In other words, it fattens out the indicator diagram and shows as a result a greater work area. Water vapor in proper proportion makes for fuel economy, longer life of the engine and less carbon.

Abridged Details of Present Kerosene Carburetors

The carburetor of the Wilcox-Bennett Carburetor Co. employs an exhaust vaporizer for the kerosene, mixing it with air and injecting it with a small quantity of water into the cylinders. Seventy pounds compression is used and the carburetor has 70 openings in the walls which progressively come into operation as the suction increases, until all are in use.

The Higgins Kerosene Carburetor as Used on Rumeley Tractors

As with other carburetors using kerosene, the engine is started on gasoline. The sectional view shows the three compartments in the carburetor, the one at the left for kerosene, the middle one for water and the one at the right for hand pumped gasoline for starting. This chamber is filled by a hand pump and the gasoline in it used each time the engine is started. The chambers are supplied with fuel at their proper levels by mechanically operated plunger pumps. The effective area of the passage at the lower side of the carburetor is controlled by a sliding valve, governor operated. Motion to the right closes the air port and opens the middle air intake port and the left mixture delivery port to the engine, thus giving the engine a larger charge. Pulling the slide to the left gives the mixing chamber more air, thus decreasing charge richness. When the engine begins to warm up, the water needle valve is hand opened to a special adjuster mark and the engine is then free to take water as the load automatically increases the piston suction in the mixing chamber sufficiently to lift the water up to the two small delivery holes marked H_2, when the water overflows and passes into the mixing chamber. The engine speeds on which this carburetor are used, vary only from 300 to 425 r.p.m., but Mr. John A. Secor, its designer and a pioneer in kerosene burning, says that there is no reason, according to his experience, why an automobile type engine should not be made to show the same flexibility on kerosene that it does on gasoline.

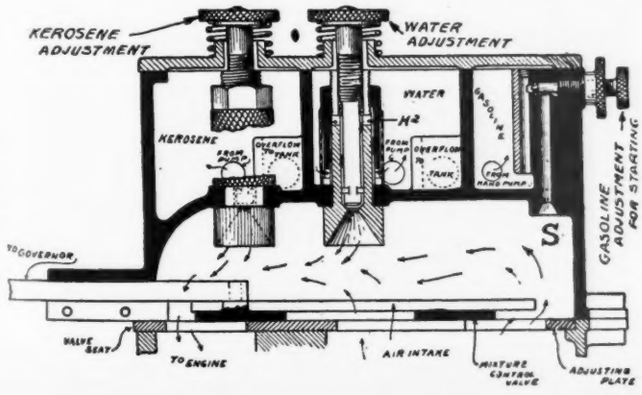
Western Kerosene-Gasoline Carburetor

In this device, there are two distinct float chambers, one for each fuel, with dash control of the fuels as desired. The intake manifold is completely surrounded by the exhaust manifold, thus heating and vaporizing the fuel mixture. The fuels are sprayed from a nozzle completely surrounded by incoming heated air which carries it upward through a series of venturi tubes.

Kerosene-Burning Carburetor

In this carburetor, a single manifold of special construction cares for both the inlet and exhaust gases and forms a vaporizer. The exhaust gases pass through the outer portion shown in the two end views on the left and in the two sectional views to the right of each of these. The incoming gases pass through the inner portion across which extend staggered rods, as shown in the two upper right views. The fuel is heated by actual impingement of the vapor upon these heated metal parts. It is claimed this method avoids "cracking" or disturbing the bonds of the molecules of hydrogen and carbon, as sometimes results where excessive heat is applied to the outside of a fuel intake column, and also avoids a mixture containing at the center of the column large globules of fuel lacking in oxygen.

With this combined manifold and vaporizer is used a special Kerosene carburetor in either single or double bowl type. When using the single bowl, it is recommended that the engine be allowed to exhaust the kerosene from it, so that it will be ready for filling with gasoline when it is desired to start.



The Higgins Kerosene Carburetor

This carburetor utilizes gasoline for starting and kerosene for regular running. A sliding valve is used to control the amount of vapor and water delivered to the engine.

Senrab Kerosene Carburetor

This carburetor not only utilizes the heat of the exhaust gases to heat the carburetor and the incoming air, but is also fitted with a three way valve, with the control for same at 12, as shown on the section. Gasoline may be used for starting and any desired mixture or kerosene only when the engine is running normally. Both the three way valve and the fuel nozzle are held in position by screws 19, and may readily be removed for inspection and cleaning. Figure 5 shows the auxiliary air valve combining the auxiliary air intake, dash pot and balanced valve, the outlet forming a continuation of the venturi. The exhaust gases enter at 17 and are discharged at 16, heating the carburetor and fuel. The incoming air is heated by passing over the exhaust connection and then passes through the heated jacket of the carburetor. The float chamber is enclosed by an exhaust heated jacket 15. This construction is claimed to thoroughly heat the fuel in the form of a thin film between the wall of the float 20 and the heated walls of the float chamber.

Foreign Carburetors

More attention has been given to low grade fuel carburetion in Europe than in America, owing to the high cost of fuel which has prevailed for several years.

Prof. Morgan and E. B. Wood, in a paper before the British Institution of Automobile Engineers, called attention to the fact that the fuel should be evaporated in the presence of some 10 to 20 per cent. of the total air required and then mixed with the remaining air, also that all fuel should be completely evaporated before entering the engine, although partial condensation might occur after evaporation. The evaporated fuel should be superheated before mixing with the main air supply, so as to produce a fog of extremely fine texture on dilution.

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

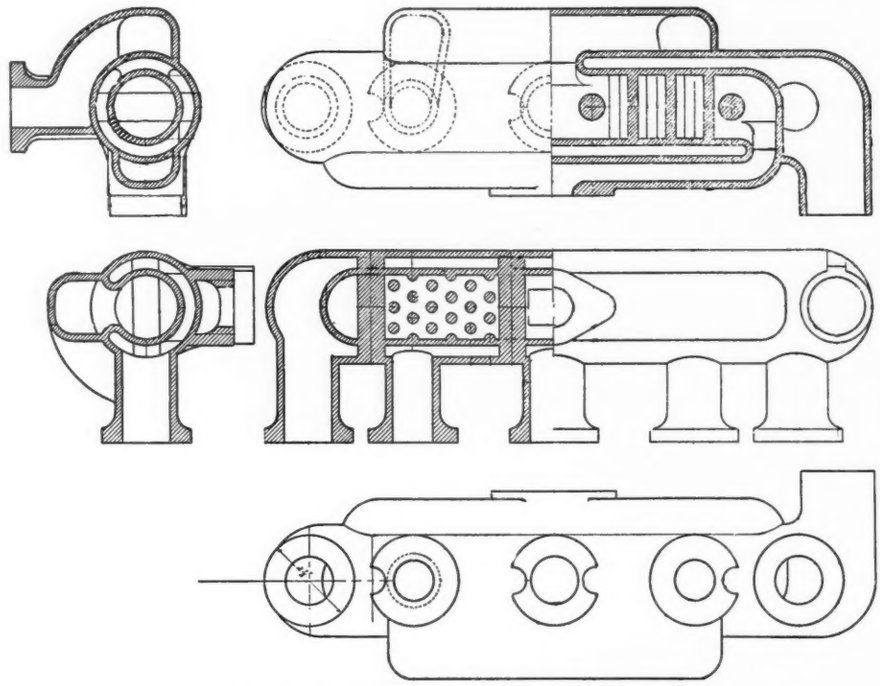
Description of G. C. Vaporizer

One of the methods which has proved fairly successful in Europe is the passing of the fuel through a special vaporizer formed by the muffler, of special construction. The interior of the muffler is here shown. The exhaust enters at N and follows the direction of the arrows along the passage D, emerging at P and then to the atmosphere. This heat is used to bring to a high temperature a large number of small loose iron bars or metal balls in an annular chamber, into which chamber the fuel is led by a pipe pierced with a large number of small holes throughout its length. The kerosene injected among the small pieces of heated metal is then gasified. Warm air in pre-determined quantities is then drawn into the same annular face along the pipe K, shown in the cross section at the lower right. This warm air is mixed with the gas and the mixture of vaporized kerosene and air is then drawn at high velocity, it being important, according to the makers, that the velocity be high, through the outlet O, and before reaching the engine is further diluted and somewhat cooled by extra air introduced into the mixture by a valve fitted in the intake. Possible objections to this arrangement are the long line through which the fuel passes, permitting condensation, also in cleaning the vaporizing device. However, many European trucks have for several years been using this arrangement and burning low grade fuels every day.

The Stewart-Morris carburetor has also been used to some extent abroad. A sectional view is herewith shown.

Details of Stewart-Morris Carburetor

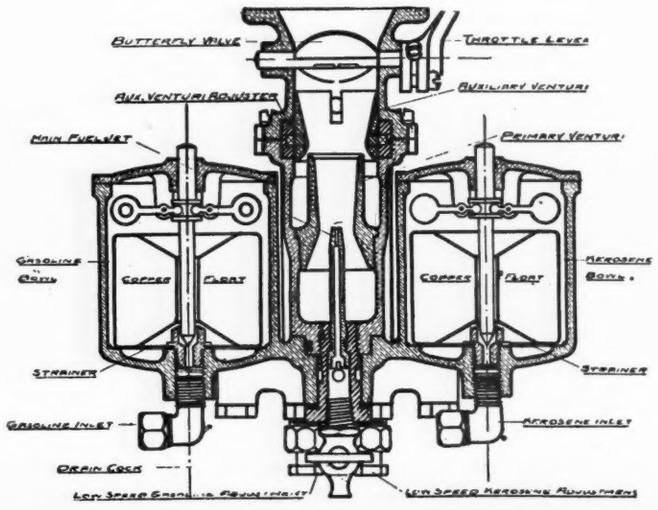
The main body A is cast with a central socket in the bottom of the chamber. In this slides a spindle C screwed at the top to check the weighted valve B, the movement of which is regulated by the suction of the engine. This valve on lifting allows the mixture to pass through orifices tapered to adjust the flow of gas to requirements. At the lower end of the spindle C a tapered jet needle E is swung from a gudgeon pin arrangement, and this passing through a hole in the cap of the chamber F is fitted at its lower end with a damper piston L, which is a loose fit in its cylinder. From the inlet G kerosene is fed at slight pressure, so that it rises through whatever aperture is permitted by the position of the tapered needle, and in the passage H mingles with whatever air is flowing in through D. This mixture then passes out from H into an exhaust-heated vaporizer, and is drawn by engine suction into the chamber HI, and from here it passes to the engine by the valve, as already explained. The air valve disc I uncovers further air orifices J, and the lever operating this is connected to the throttle lever by a nicely adjustable connection, A, so that throttle and air valve operate in a predetermined proportionate manner.

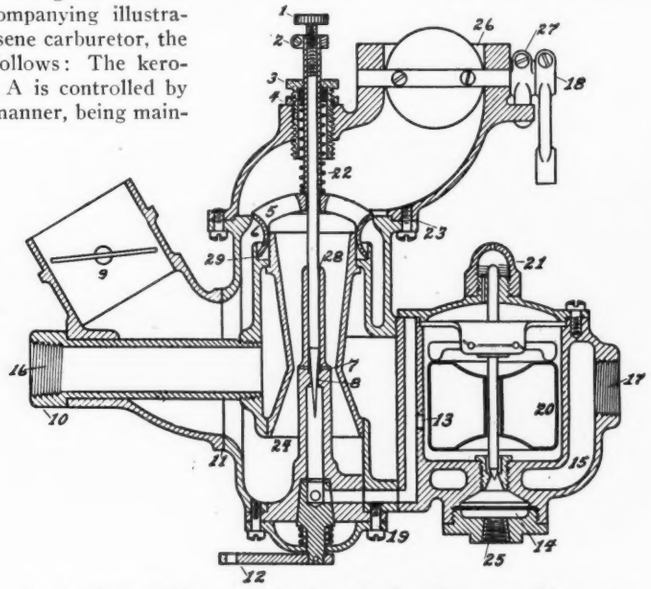


Section Views of the Intake and Exhaust Manifolds Used in Connection With the Special Kerosene-Burning Carburetor

Novel Kerosene Carburetor Which Ignites the Fuel Before It Enters the Engine

Perhaps one of the most unique methods in the attempt to handle low grade fuels is that shown by the accompanying illustration of the Radical kerosene carburetor, the action of which is as follows: The kerosene oil in the chamber A is controlled by the float B in the usual manner, being maintained at a proper height for the jet D. The union at the bottom of this jet is connected by a pipe with the pressure valve, which in turn is connected with the compression chamber of one of the cyclinders of the engine. This compression blows the fuel upward in a spray, indicated by the dotted line diverging from the jet. At the center will be seen a rod projecting downward and between this, which acts as the ground electrode, a spark passes from the spark plug down at the side, thus igniting the mixture while still in the carburetor. The flame then passes through hole M into the annular passage F. The flame is forced by a partition to pass around the chamber H before reaching the throttle. The flame, although already ignited, contains an excess of fuel, so that it is comparatively cool. Just





On the Left is Shown a Section of the Western Kerosene-Gasoline Carburetor. The Illustration Above Shows the Senrab Kerosene Carburetor

before entering the throttle chamber, however, additional air is added through an opening M, controlled by a slide J.

In speaking of this device, in connection with tests on same, the engineer in charge said: "It might be quite reasonably expected that this premature burning of one charge would lead to loss of heat and so efficiency in the engine, yet although this is undoubtedly so to some extent, the amount of loss is nothing like as great as would be imagined. Freedom from carbonization in the cylinders and the ability to start the engine cold are features of this device." He further says: "Two turns of the crank never failed to start the engine, and when it started, it ran steadily and the exhaust was perfectly clear, showing smoke only when the engine was raced, this being due chiefly to lubricating oil. There was some suggestion of kerosene smell, but not enough to amount to a nuisance."

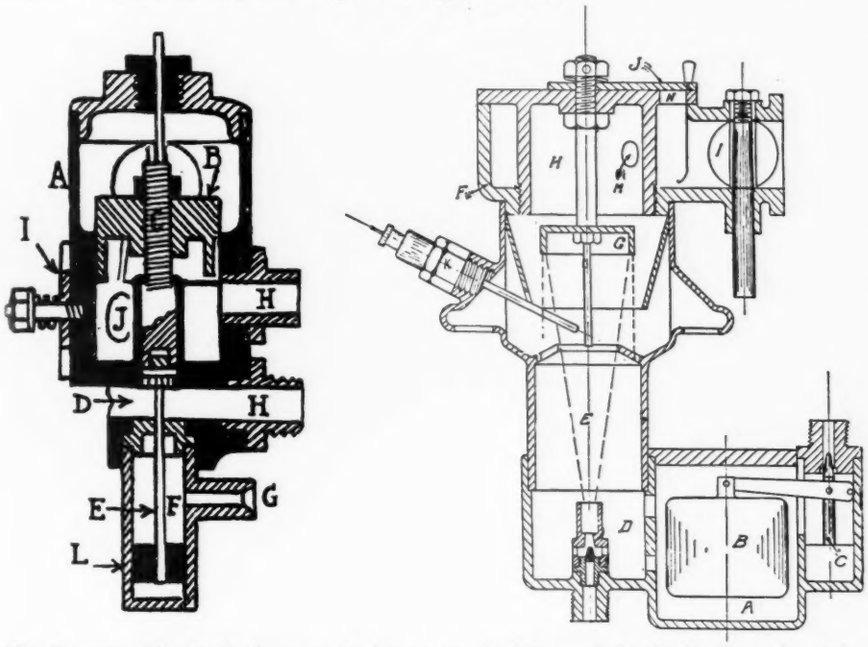
In Conclusion

From a study of the present fuel situation, it is evident that with the phenomenal increase in the automobile industry and its accompanying demand for gasoline, together with the increase in tractors, motor boats, farming machinery, stationary engines, and other devices burning gasoline, and all this combined with an exportation many times that of any previous period, there is not sufficient gasoline for any extended term of years, unless something is done to change existing conditions. Europe is begging for fuel and is willing to pay almost any price for it. Although there are independent makers, so-called, there is practically no competition between them and the Standard Oil Co., the smaller refiners, accepting thankfully the price, no matter how high it may be. The difficulty of fuel transportation by pipe lines and the rates and control of these lines by the large companies, thus militating against smaller companies, is a matter of Government record and has largely prevented the growth of the smaller producers.

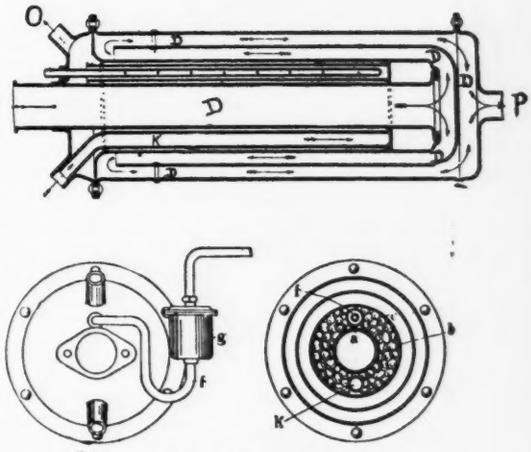
Remedies

The remedies seem to be a control of the distribution and the exportation of fuel, either by a tax on exports, as now before Congress in the Britten bill, or by some other method not yet devised. The improvement and general use of more economical distillation processes, a curtailment of waste and the development of crude oil fields and oil bearing shales and the natural gas districts.

The motoring public look to the automobile industry for protection. In protecting them, the industry protects itself. There is surely capital enough as represented by various individuals in the industry to produce independent refineries and sufficient pipe lines within the next few years to create some real competition. The industry as a whole must recognize and meet conditions as they are, which means the use of kerosene as a fuel in the near future. The Society of Automobile Engineers, as a body, can have no more important work than an investigation of ways and means for making automobiles and trucks efficient on the less volatile fuels which apparently must form a large part of the future motor car supply. The suggestion is here made that this subject be investigated by a suitable committee or committees, that prizes be offered for the most efficient devices which engineering ingenuity can devise within a limited time for handling kerosene or other possible substitutes for gasoline. And that this information be freely placed in the hands of all car, truck and carburetor manufacturers to guide them in placing on the market at the earliest possible date automobiles which can handle any hydro-carbon in an efficient manner. There is certainly no more important work that the Society can undertake, and this work and investigation should rank with the great work of Standardization.



The Stewart-Morris Carburetor is shown on the left, and the Radical on the right



Views of the G. C. Vaporizer

A View of One of the Floors of the Jacobson Machine Manufacturing Company, of Warren, Pa.

This company specializes on semi-floating and three-quarter floating axles. It is equipped to turn out about one hundred and fifty sets of axles per day. This company is also prepared to take on orders for quantity production on straight bevel work.

The CCJ has most advertisers because it gives them biggest returns

Transportation in the Telephone Business

By LEONARD V. NEWTON

PINKNIVILLE, as it lay peacefully on the banks of the Roanoke, was a sight worth beholding. The setting sun reflected in the once clean windows of the numerous old mills along the river, while only here and there smoke arising from their stacks gave indication of any life within their walls.

Serene as such a sight may seem, the effect was depressing, for in the town where business should have been booming, many vacant stores displayed bailiff's signs, indicative of past financial disasters. Had it not been for the few trains that stopped at Pinkniville with the resultant activities around the postoffice and hotel, the town would have been devoid of any real life.

Throughout, the air was one of hibernation, and in the telephone exchange, conditions were equally as dormant, traffic having fallen to its lowest calling rate and no construction work was justifiable—nor had any gone on for many months previous.

* * *

In Europe war had been declared. Each of the countries involved in the bloody maelstrom could boast of many such towns as Pinkniville, and, although the effect was devastating for these villages, for Pinkniville it offered the last chance. Pinkniville received a large quantity of war orders, and within a few weeks the factories hired all available hands to manufacture munitions. The result was a tremendous boom, totally beyond belief.

Shortly the demand for telephone service increased at an unprecedented rate. The engineering and plant forces worked overtime, plans were brought forth from musty shelves and estimates were approved with unwonted speed. The Commercial Department, flooded with orders for new telephones, promised installation on what seemed "safe dates," but, although every effort was made, some way or other, facilities could not be made available and new promises had to be given.

The impetus of new life in the town of Pinkniville resulted, among other activities, in the formation of a City Beautiful Association, and it was with truly civic pride that a movement was fostered to clean up the town. It was not, therefore, surprising that residents and business men soon began complaining about the unsightly cable reels, which were to be seen upon nearly every street, saying that they were an obstruction to traffic and dangerous to life.

Late into the night the creaking of the windlasses and the pound of the horses' hoofs could be heard, but even with all these worthy efforts of the plant forces subscribers would not be satisfied, and service seemed to deteriorate instead of improve.

Men, no matter how good or great, can stand pressure and criticism only for a given time, and the superintendent was only human. Realizing that he was losing ground and that work could not be done with necessary speed, he called a conference of his foremen to ascertain what was wrong. In running down all points, it was found that the greatest trouble involved was that the vehicles were not keeping up with the work at hand. It was decided, with much misgiving, to purchase a few motor trucks to facilitate the work, and with the hope of some relief in sight, the work was resumed with new vigor.

At the time of purchase, quick deliveries of the trucks were promised, but after a few weeks, the Superintendent was still without the sought-for relief, and conditions were worse than ever before.

The trucks finally arrived, however, and upon inspection it was found one was equipped with a power-driven windlass, which had not been ordered, but it was accepted, due to necessity.

The result, after a few days, was success on a small scale, wholly beyond the expectation of the Superintendent and foremen, as the trucks were delivering the material as fast as the construction gangs could use it.

However, the cable pulling work was not progressing even with day and night shifts—and this condition remained until one day, just as the truck was delivering cable splicer's material to one of the most important jobs, the windlass which had worked so faithfully broke, stopping all further work until it could be repaired.

To hold up that particular job would have had chaotic results, and, after much pondering and the foreman espying the windlass on the truck, with much misgiving decided to put it to work.

Such cable pulling had never before been seen—the rapidity of the pulling being such that only with difficulty could the men feed the cable off the reel quickly enough—and the foreman completed not only this job, but all the work outlined for that week.

After this unprecedented performance, it was decided to hold another conference, at which it was found that the results obtained with the trucks would justify further expansion. But it was decided, before purchasing, that a scientific study should be made of this particular problem.

The Superintendent, therefore, detailed one of his best foremen, particularly adapted to this work, to determine just what was necessary.

In due time he reported back his findings, and it was his recommendation that the horse-drawn vehicles be abandoned and motor equipment substituted; that a department whose sole object was the handling of the various transportation problems and the control of such motor vehicles be formed.

This would involve, first of all, a garage and shop building in proximity to the warehouse, capable of housing the necessary cars, enough additional space being allowed for further expansion.

The garage organization was to consist of necessary clerks to handle the dispatching of cars, and the necessary night force to make any and all repairs at night, in order that cars might be available for work every day in the year.

The city was to be divided into districts, each of which was to be in charge of a clerk, whose duty it was to receive orders for work to be done in his district and properly dispatch the cars.

The new motor equipment necessary to purchase consisted of cars to cover instrument delivery, material delivery, cable and pole delivery, cable repair and line order work.

Considering briefly the points which were found eminently vital to each of these various branches of service: The instrument delivery cars were to deliver new telephones and pick up vacant premises stations. In order to operate the smallest number of trucks in this service and still accomplish maximum results, special stress was to be laid upon correct routing and accurate addresses.

The material delivery to be best handled had to be of such a nature that at short intervals the chauffeur would call the dispatching clerk, in order to receive further orders for additional work for his truck.

Cable and pole delivery, although closely associated with material delivery, could not be handled efficiently by commercial cars, due to their limited capacity. It was for this reason that a combined cable and pole tractor was decided upon, the theory being that both pole and cable stocks could be cut down to care for emergency use only—and furthermore by this method of transportation, it would be possible to haul cable and poles directly from the cars to the job, thereby doing away with all rehandling, both in the storage yards and at the job.

As it is imperative in the telephone business that there be no interruption of service, every precaution must be taken to preserve this high efficiency, particularly in stormy weather, when cases of trouble are inevitable. The cable repair outfit was, therefore, equipped with a pump and necessary tools, in order that the repair crews could reach the locations of the trouble quickly, thereby minimizing the embarrassment to subscribers and the destruction of the company's equipment.

For the quick transportation of the line order gangs to and from jobs, motor vehicles seemed to be invaluable, although in this class of work the saving over horse and wagon methods would probably not be striking.

* * *

The town of Pinkniville today is a majestic city along the river that once flowed unharnessed, but which today supplies power for the mills and electric plants. Everywhere is there a spirit of hurry, bustle and activity. The main street, which once was the pathetic scene of disaster, is a great white way of commerce. Here and there one of the trucks of the telephone company may be seen engaged in their various functions—it being fitting that the telephone company should have such modern and efficient transportation methods to keep step with the progress of the day.

The CCJ leads in circulation, advertising and prestige

Gasoline-Electric Tractors in New York City Street-Cleaning Service

FOR some time past the New York Street Cleaning Department has been trying out various tractor and trailer combinations for the collection of ashes, garbage and street sweepings, as well as for mechanical sweeping and flushing of streets. The experience gained in this experimental work showed that while the electric tractor was highly desirable from the standpoint of operating simplicity, the mileage limitations imposed by the storage battery equipment was a handicap. Further, that because of the many stops in collection work (60 to 100 per hour) the gasoline tractor with gear transmission clutch, spark and throttle control was not only impractical, but presented the disadvantage of greater complication with the resulting necessity for a higher class of drivers.

It has long been appreciated that the real work of the street cleaning and flushing must be done at night, and the collection of refuse during the day. This calls for at least 16 hours' service in twenty-four.

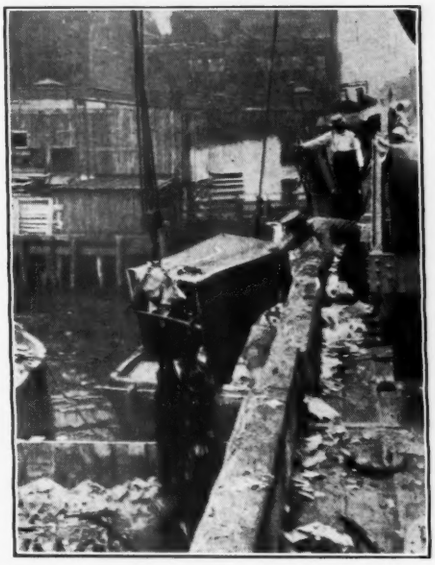
A type of tractor which would be capable of practically continuous operation, and adaptable to either kind of service, was evidently necessary. A tractor equipped with a gasoline engine driving an electric generator, whose output could be used in motors driving rear wheels, was accordingly chosen as having the simplicity of control of an electric vehicle and the relatively large mileage capacity of straight gasoline equipment. This combination also presented the advantage of providing in the most convenient form, energy for driving the auxiliary apparatus used in street sweeping and flushing.

Except for railway service, comparatively little development has been carried through on vehicles driven in this way, and the problem involved in the design of the tractor was of a very complex nature.

Details of Construction

A semi-technical description of twelve tractors which have been constructed by the General Vehicle Co., Inc., of Long Island City, for the Department of Street Cleaning, City of New York, follows:

The tractor frame is built of structural shapes, amply reinforced and is carried on semi-elliptic springs of generous proportions. Wood bumpers, reinforced with steel,



Dumping a Load of Refuse Into Barges at the River Front

protect both front and rear ends. The axles are both made of round alloy steel, and the wheels are carried on Timken roller bearings.

Two sets of brakes, both of the internal cam expanded band type, are provided, both for foot operation, one engaging drums on the rear wheels, and the other drums on the intermediate gear shafts.

The motors are suspended by links from extensions of the rear spring hangers, and by extensions of their cases which bear on the rear axle. The motors drive by spur gears to intermediate shafts, which carry pinions engaging with internal ring gears mounted on the rear wheels. The use of pressed fabric pinions on the motor shafts resulted in extremely quiet operation. The motors themselves are, except for the special cases, of the standard automobile type with ball bearings.

A consideration of the heaviest operating service, which will be when performing the work of street sweeping and flushing, showed that the power consumption over and above that necessary for propelling the tractor and sweeping and flushing trailer, would be about 15 h.p. Taking into consideration the probable mechanical and electrical losses, and the requirement for traction of approximately an equal amount, a 40 h.p. gasoline engine was thought to be a proper selection. The engine used in the tractors is a four-cylinder Waukesha, cylinders cast in pairs with 4¾x5¾ cylinders. This is equipped for forced lubrication, has a Zenith carburetor, dual ignition system with Bosch magneto, centrifugal water pump circulation through a large Rome-Turney radiator built in an aluminum shell, and supported directly on the frame, without springs. A centrifugal governor maintains a rotative speed of 900 r.p.m., this latter being the rated speed of the electric generator.

The generator was built by the General Electric Co., and is rated at 15 K.W., 125 volts, 120 amperes at 900 r.p.m. The electric wiring is all carried in metal conduit, and controller, cut-out switch and ignition switch are placed in a sheet steel box beneath the driver's seat.

On account of its being necessary to operate close to the curb a great deal of the time, right hand drive was chosen, and the controller handle is also placed so as to be operated by the driver's right hand. In order to make it unnecessary for the driver to concern himself with anything

Three Views of the Gasoline-Electric Tractor Used by the New York Street-Cleaning Department

The collected material is carried in eight water-tight cans

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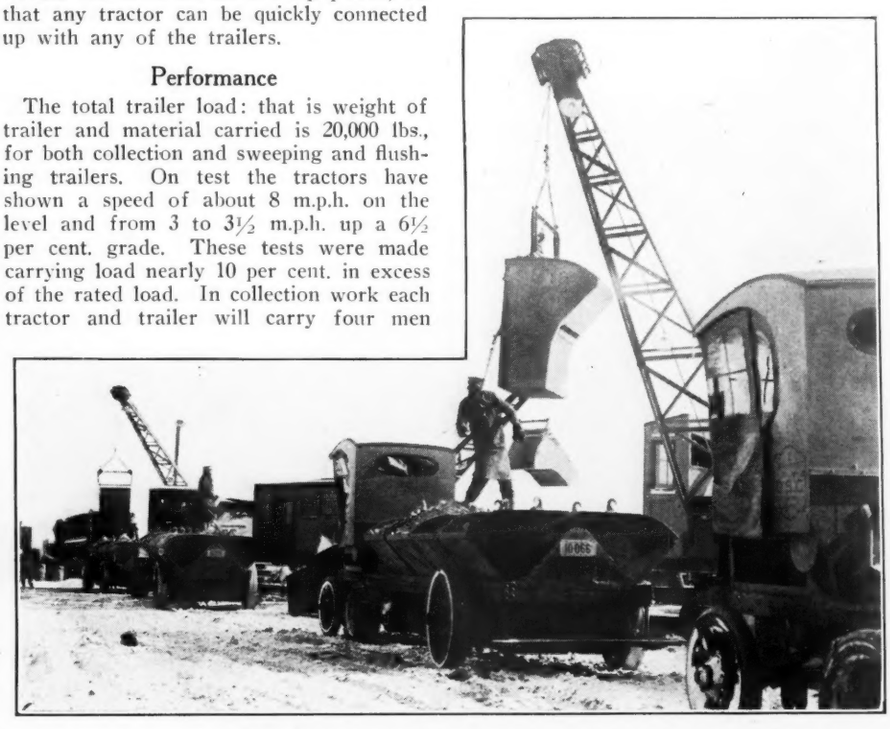
other than the controller lever, brake pedals and steering wheel, a magnetic device for operating the carburetor throttle is provided to automatically open the throttle when the controller lever is moved in either direction from neutral. This is accomplished by the use of a solenoid of the plunger type which is connected by linkage to the throttle lever. The coil in the solenoid is connected in multiple across the generator terminals through a contactor on the controller shaft which is so arranged that a slight motion of the controller handle from neutral position in either direction will close the circuit, and automatically speed up the engine before the driving motors begin to draw current. A protecting resistance is automatically cut into the circuit by the plunger before it is entirely seated. The device is so arranged that it will operate with the engine turning over at one-third normal operating speed. The engine operated on fixed spark and the spark is automatically retarded when cranking by means of linkage actuated by the ratchet which the starting handle engages. The controllers are of unusually heavy construction for vehicle service and are arranged to give five speeds forward and two reverse. The driver's seat is protected by a cab.

A steering gear of the double screw and nut type with slightly raked steering post is provided, and provision has been made in the design of the front axle and steering knuckles for an unusually large turn of the wheels so as to give a small turning radius. The tractors were also built with the shortest possible wheelbase consistent with accommodating the trailers to be used with them, in order to permit turning tractor and trailer in a narrow street. It was found possible to reduce the wheelbase to 72 in., and with the long refuse trailer in place it is possible to turn tractor and trailer in a 30-ft. street Shadbolt fifth wheels are used on all the equipment, so that any tractor can be quickly connected up with any of the trailers.

Performance

The total trailer load: that is weight of trailer and material carried is 20,000 lbs., for both collection and sweeping and flushing trailers. On test the tractors have shown a speed of about 8 m.p.h. on the level and from 3 to 3½ m.p.h. up a 6½ per cent. grade. These tests were made carrying load nearly 10 per cent. in excess of the rated load. In collection work each tractor and trailer will carry four men besides the driver who will supervise their work. In ordinary districts a crew of this size will be able to handle the work rapidly enough so that the tractor will be in operation more than it is standing. At the dumping dock the collected material which is carried on the collection trailer in eight watertight cans will be lifted out and dumped by electric locomotive cranes, and it is expected that when these are in full operation the work will be handled very expeditiously.

The trailers to be used in the work of street sweeping and flushing will include a tank to carry 1500 gals. of water, sprinkling and flushing nozzles, a pump driven by electric motor supplying the flushing nozzles, and a rotary broom, also operated by electric motor. On the basis of tests which have been made on equipment performing these same functions it is expected that a great saving will be effected in this work also. When all the equipment is in service the department expects to be able to operate the tractors practically 16 hours a day, and it is needless to say that if this is done a high standard of efficiency will be obtained.



Lifting Out the Watertight Cans by Electric Locomotive Cranes

STERLING REPRESENTATIVE SEES BIG BUSINESS AHEAD, BUT DECRIES LONG-TIME PAYMENTS

By C. P. SHATTUCK

W. S. Mears, sales manager of the Sterling Motor Truck Co., Twelfth avenue and 132d street, New York City, which concern was known as the Sternburg Motor Truck Co. of New York City up to December 10, says that the future of the motor truck industry never seemed better, and business has increased about 400 per cent. over that of two years ago and is growing rapidly. In speaking of the contract with the manufacturer, Mr. Mears said: "I personally believe that the manufacturers aim to be liberal with the agent and desire to assist him in promoting sales. The trouble is at the present, that they are not selling trucks. Concerns are buying trucks regardless of the terms of the manufacturer and the agent, and the salesman, in order to sell with the least resistance, is giving the purchaser all he asks. The principle troubles in selling trucks at the present time are the 'trade in' proposition and deferred payments. Deferred payments in New York City, if not curtailed in the very near future, will kill the business."

W. S. MEARS
Sales Manager of the Sterling Motor Truck Company

Mr. Mears opines that the manufacturer of trucks will soon be in the banking business, and suggests that cars be sold on a nine-months plan. Under such conditions the business could be successfully handled, and profitably. Mr. Mears stated that he had lost a large number of sales because some of the larger companies allow 18 to 20 months. "I figure that 12 months should absolutely be the time limit, and that the notes be endorsed by responsible parties other than the purchasers of the truck," said Mr. Mears.

The representative of the Sterling said that there are many kinds of service, and that the word is greatly abused and misinterpreted. The plan of the company is to carry a complete stock of all parts of all models and to inspect each machine used at least once a month. A list is maintained of expressmen and owners in the carting business who have chasses equipped with bodies adaptable to all requirements, and in the event of a customer's truck being entirely disabled, he is put in touch with an owner who will rent his machine until the injured vehicle is repaired. The repair department is in operation day and night to facilitate service. In speaking of the price of a commercial car, Mr. Mears stated that a truck cannot be made too sturdy for the work it has to do, and that an efficient car cannot be produced at a low price, especially if the manufacturer gives long terms and a broad guarantee.

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

Commercial Cars to Relieve Railroad Terminal Congestion

Antiquated Facilities and Poor Delivery Systems Boost Costs. Moving Platforms and Mechanical Carriers Suggested to Replace Horse and Man Power.

By A. JACKSON MARSHALL, E. V. A.

FREIGHT congestion at the terminals and steamship piers of all our large cities and especially New York has become a very knotty problem during the past year, and we are hearing a great deal about the chaotic condition into which freight distribution, both domestic and foreign, has fallen. The reason for this unusual congestion is, of course, obvious when we consider that approximately 1000 vessels, of which a large proportion were merchant steamers, with an estimated tonnage of 2,000,000 tons, have been destroyed directly or indirectly as a result of the European war, while in addition to this are the great numbers of vessels which have been taken for transport service or have been interned. At present over one million tons of freight are stalled at New York terminals, and steamship piers in all of our seaport cities are stacked to the roof beams with freight intended for distribution.

While the shortage of ocean carriers is the major reason for present conditions, a great deal of the congestion would be considerably relieved if freight were handled in a more efficient manner at the terminals. Because of old-fashioned methods, antiquated handling facilities and confused schedules, steamers are delayed for long periods. Vessels can be rapidly loaded if cargoes are delivered properly and if they can pass through the terminals with a minimum amount of delay. With the present lack of system and inefficient handling of freight this is utterly impossible.

Lack of System

Not only export trade has been affected by the congested condition of our terminals, but domestic transportation suffers as well. Shortage of ocean tonnage is not responsible for the fact that local merchants are unable to get their goods through the terminals. It is estimated that there is a total of 720,000,000 tons of goods every year that passes through the railroad freight and transfer stations of this country and 600,000,000 tons handled at marine terminals, making a grand total of 1,320,000,000 tons of freight handled annually in the United States, or 4,400,000 tons every working day in the year. The present lack of system in handling this freight and the tremendous amount of lost time involved represents a yearly loss of more than $80,000,000 at railway terminals alone. We pay $2,000,000,000 per annum in the United States for freight transportation, four-fifths of which is for terminal work, or about $1,600,000,000. This is a great economic waste, which the public does not yet fully realize, and one which has a direct bearing on the much abused "high cost of living."

Railroad officials agree that the present transportation is the heaviest traffic in all railroad history, and the peak is not expected for some time to come. The railroad freight now accumulated in warehouses, in the process of loading, and in cars banked up on terminal tracks would fill several times over the ocean space in use in export trade. In the entire district of Greater New York there are over 40,000 cars burdened with freight consisting of food and manufactured goods from the West which cannot be moved for lack of transportation facilities. The number of New York Central cars alone waiting to be unloaded is in excess of 10,000, while the Pennsylvania Railroad has nearly 12,000 cars stalled on terminal tracks. On the New Jersey Central there are 35 miles of loaded freight cars lined up, awaiting discharge.

Poor Terminal Facilities

All of the railroads agree that the great obstacle to movement is the deficiency of terminal accommodations and poor facilities. No railroad can be more efficient than the terminal facilities permit it to be. With a few exceptions freight terminals and their managements remain substantially the same as they were twenty-five years ago. With an eye to the speeding up of line haulage conditions, transportation experts have made the line itself the acme of perfection, but they have left the freight terminal with its gross imperfections severely alone. William C. Redfield, Secretary of Commerce, is quoted as saying:

"Railroad tracks, roadbed, bridges, motive power, cars, signals, and, in fact, all the mechanical and engineering sides of the railway proper, show the impress of the last word of mechanical development. It is only when we go into the railway freight shed that we go back into the dark ages of industry. There the human worker still reigns supreme, rolling up an annual payroll of millions and congesting traffic by his cumbersome motions. Here freight is moved by the crudest kind of labor and with an apparent absence of any attempt at scientific handling. I am absolutely sure that mechanical appliances can be employed for the greater part of the work. Look about you at the great freight terminals. Where are the moving platforms, the mechanical carriers, and the motor trucks? We have almost wholly failed to apply to the handling of package freight the principles of mechanical transferring with which we are quite familiar in other lines. We complain about our freight rates, but nobody seems to worry much about our terminal charges, and yet the terminal charge is as inevitable as the carrying charge, and is by far the largest part of the entire rate. We are today paying freight bills without giving a thought to the fact that a part of the work for which we pay is being done in a highly scientific way, while still a larger part of it is being done by methods which it would be complimentary to call medieval."

Terminal and Hauling Charges Compared

In comparing the cost of handling freight at railway terminals with the cost of hauling by rail, the following tables developed by the Electric Vehicle Association of America are based on figures given by W. J. Wilgus, late vice-president of the New York Central Railroad. As a concrete example, we will suppose that a manufacturer in Philadelphia sends one ton of freight to a merchant in New York City. From the time the freight leaves the manufacturer the Philadelphia charges are as follows:

Labor cost of loading on a wagon	$0.25
Unloading at freight station	.50
Cost to railroad in billing and other clerical work	.40
Actual operating expense of loading & switching freight car, etc.	.25
	$1.40

The cost of handling in New York is as follows:

Terminal costs on New Jersey side of North River (average of all railroads)	$0.15
Lighterage	.80
Terminal cost on water front of Manhattan Island	.50
Cartage expenses in N. Y. City	.80
	$2.25

The terminal charges at both ends equal a total of $3.65 on one ton of freight. It costs the railway to haul freight 3 mills per ton mile, or for the 90 miles between Philadelphia and New York it costs 27 cents per ton. The cost of getting a ton of freight started on its journey at one end and handling it from the Jersey City terminal to the consignee's store at the other end is nearly 14 times as much as the cost to haul the goods all the way from Philadelphia to New York. To haul a ton of freight 1000 miles from New York to Chicago costs $3, or 65 cents less than the terminal charges at both ends. In other words, it costs more to load a barrel into a car at Chicago and to unload it at New York than it does to move the same barrel between the two cities on the railroad.

The fact that drayage and terminal expenses of freight transportation is 22 per cent. more than the line haulage of the same freight over 1000 miles of railroad, is a condition toward which every effort should be exerted to remedy. No one thing alone can solve the problem. In the first place, co-operation between railroads, steamship

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companies, trucking concerns, manufacturers and the public itself is vital. Certain it is that as surely as it is a problem in transportation, improved transportation appliances, when once established through the united efforts of everyone interested, will work its solution. In the forerank among these appliances stand the commercial car, the electric industrial truck, overhead telpherage systems of freight movement, the gravity conveyor, etc. As the connecting link between the terminal and the merchant the motor truck must assume the first position.

The piers and railroad freight terminals of most of our great centers create by their congestion a condition which makes it impracticable for the motor truck to step in and even point a possible way to solve the problem. With the congestion at these terminals so bad, motor truck owners are loath to send their trucks there. A motor truck under most conditions is far more economical than horse-driven equipment but like any other vehicle it is only making money when it is under way with a paying load, and where it is idle for a long time the interest charges on its first cost cut into its earning capacity at a rapid rate. It is not at all infrequent for vehicles to have to wait for three to four hours every working day in the year. With motor trucks this delay causes an actual loss of from $200 to $500 per vehicle per year.

The "Electric Stevedore"

In places where some modern equipment has been installed, such as the electric industrial truck, a more systematic condition has resulted and a considerable economy been effected. In the railway terminals where the electrically propelled baggage truck has supplanted the hand truck, it is estimated that there is a total saving of 66 per cent. Down in Savannah where the "electric stevedore" has been in use for some time, you may see cotton moved across great piers by these little electric trucks equipped with hoists and cranes, carrying it directly into the holds of the steamers which bring it North. Two of these electric industrial trucks would handle more cotton in one day than twenty freight handlers with hand trucks.

A report of the operation of an electric industrial truck at the Cunard pier, New York City, showed that in handling macaroni in boxes, six "electric stevedores" did the work in nine hours that would have required 24 hand trucks. The cost of labor with electric vehicles was $21, while at current longshoremen's rates it would have cost for labor $87.50, if hand trucks had been relied upon. In handling grapes in barrels at the same dock, two industrial trucks did the work of 21 hand trucks. In handling mackerel in barrels, two electric industrial trucks did the work of 19 hand trucks. In handling casks of wine, seven electrics with thirteen men did the work of 36 men rolling the casks from one man to another. Under the method of hand truck operation, the cost per ton of handling freight at railroad terminals and steamship piers is 25 cents, while the cost per ton for performing the same work with electric industrial trucks is but 10 1-3 cents.

As the use of the "electric stevedore" increases and other modern methods and appliances are installed, it is to be hoped that this will influence a further systematized manner of delivery. As this work becomes more thoroughly unified, freight sheds and docks may find it desirable to operate on a full or partial 24 hour schedule. In cases where the limited ground space available in our city terminals prevents the installation of mechanical carriers that would bring about economy and efficiency, the remedy which appears most feasible to the writer is the establishing of large outer platforms or warehouses where all outbound package freight could be assembled and consolidated, and where the floor movement would be performed by the electric industrial trucks.

Shippers Should Co-operate

The difficulty of having individual and separate concerns agree to any adjustment whereby to each truck would be allotted a time to call for and deliver freight is apparent, although much could be accomplished with the proper sort of co-operation.

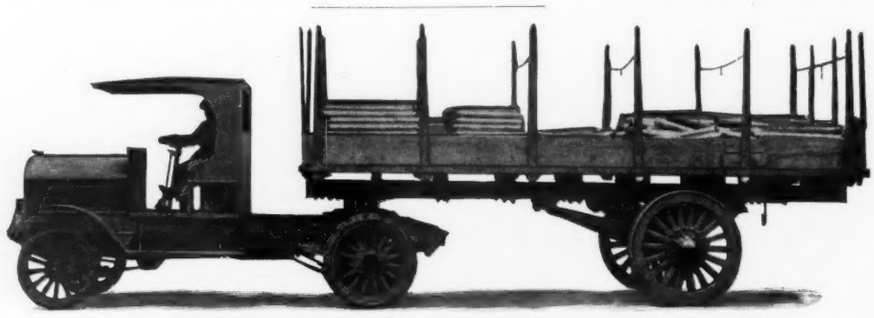
It is estimated that about 40,000 vehicles are constantly engaged in trucking to piers and terminals on the west side of New York alone. Nearly every merchant sends his trucks to the terminals at about the same hour. The result is a dearth of business between 7 a. m. and 9.30 a. m., at the receiving pier, and a dearth of business between 1 p. m. and 3 p. m. on the shipping platform. Between the hours of 9.30 a. m. and noon on the pier, and between 3 p. m. and 4.30 p. m., when the shipping platforms close, both are so busy that long lines of vehicles wait outside each. Some of these vehicles wait for hours before they can get on the piers or up to the platforms. During the afternoon there is practically no business on the shipping platforms. If some systematic schedule were arranged whereby the business could be evenly distributed at both points during all or part of the 24 hours by means of night and day shifts, an annual estimated waste of over $1,000,000 at the New York terminals alone chargeable to delay would be eliminated.

It is not always possible for freight houses to spread over more ground. If we look ahead for a few years and see the volume of freight business tremendously increased, cities built up closely and densely about freight terminals, and the continuous growth of street traffic, we can the more fully realize the necessity of applying good engineering principles to solving the freight transportation problem before it assumes any larger proportions. Railroads and steamship companies are finding it more difficult each year to obtain additional space for yards, freight and passenger terminals, warehouses, etc., and the cost of grounds for these purposes are becoming well nigh prohibitive. If freight upon arrival were properly handled and delivered, it is likely that the steamship and railroad companies could decrease space now given to receiving and dispatching freight, while the extra area thus obtained could be devoted to a future increase in business proportionately.

Motor Trucks Save Space

A single horse delivery wagon is about 18 ft. long and occupies about 90 sq. ft., while a small motor vehicle of similar capacity occupies scarcely more than 10½ ft. in length, or 60 sq. ft., a saving of at least 25 per cent. with an extra space for maneuvering allowed. If only half of the vehicles used in trucking on the west side of New York were replaced by motor trucks, the saving to the pier owners of this district alone in increased space available for storage would be close to $300,000 a year.

Night delivery should be an important factor in the proposed plan of operating on a scientific schedule. In the first place it would greatly reduce congestion in the trucking sections of our cities and partially eliminate the present sidewalk obstruction, which is a result of the existing custom of dumping freight on sidewalks, making it almost impossible for pedestrians or workmen to get through the miscellaneous collections of boxes, barrels, etc. In the case of large wholesale houses, for example, goods received at night could be unpacked and displayed when necessary for the next day's business, and the packing department would be free for the day to handle shipments, thus approaching the straight line theory of efficient manufacturing. The possibility of losses by theft or error, due to the fact that merchandise at present must pass through several hands in the process of delivery, would be reduced to a minimum by the establishment of a well organized delivery system. A reform of this kind would also materially decrease the cost of transfer from freight terminals to final destination in the city, which as has been pointed out means as much or more than the total cost of carrying goods by rail or water over much longer distances.



Mack Truck Hauls Thirty-Three Thousand Pound Load

This Mack Tractor Trailer is shown with a 33.305 lb. load of high-explosive 3 in. shells, partly completed. Where the trip from factory to factory takes one-half hour with motor truck, it takes a day to ship the same load by freight. Mack Trucks are made by the International Motor Company of New York City.

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Motor Truck Design and Construction Made Plain

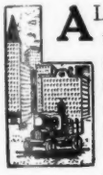
Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is a series of articles by this well-known writer, covering in a non-technical way, the various constructions now current practice in commercial car design. Preceding articles covered General Types of Chassis, Two and Four-Cycle Engines, Types of Cylinders and Their Parts, The Valve-Operating Mechanism and the Crankcase, Engine Lubrication, The Engine Cooling System, Carburetion and Carburetors, High-Tension Magnetos, Low-Tension Magnetos and Battery Systems, Inductor Magnetos, Governors and Speed-Controlling Devices, Clutches, Unusual Features of Design, Transmissions, The Universal Joint and Differential, The Final Drive, Front and Four-Wheel Drives, Brakes, The Front Axle, The Steering Gear, The Frame, Power Plant Arrangement and Its Mounting, Springs and Suspension, Motor Truck Wheels.

PART XXIII

THE MUFFLER



ALTHOUGH it is not essential that motor trucks operate as quietly as pleasure cars, it is quite essential that they operate without disagreeable noise. For this reason the exhaust must be muffled, which is accomplished by passing the spent gases through a muffler before they are discharged into the atmosphere. This muffler is sometimes referred to as a silencer. The object of the muffler is to permit the gases to expand and to cool, thereby reducing the pressure, which is the cause of the noise when they are discharged into the atmosphere directly. It is quite simple to obstruct the passages of the gases from the engine to atmosphere, however. In order to discharge them without disagreeable noise, they must be permitted to escape very freely, so that they will not create any back pressure on the pistons during the exhaust stroke.

Muffler Not Close to Engine

In most cases the muffler is mounted as far away from the engine as the general chassis design permits. It is usually mounted under the frame of the vehicle. This arrangement permits the engine to exhaust into an exhaust pipe of considerable length, the capacity of which is sometimes as much as four times the piston displacement of one cylinder. This long pipe gives the gases a chance to cool before they reach the muffler, while the latter should be arranged in such a manner that heat may rapidly be abstracted from the gases.

Mufflers generally consist of a series of expansion chambers which communicate by means of fine and sometimes tortuous passages, and after passing through these chambers the gases are finally permitted to escape. Mufflers should possess certain features, a construction which permits cleaning, strength to withstand pressures of gasoline—air vapor explosions at atmospheric pressure and ability to resist vibration. Cleaning is necessary, as lubricating oil and solid carbon particles held in suspension by the gases will clog the fine passages and increase the back pressure. Some mufflers are so constructed that they can be dismantled for cleaning. Explosions in the muffler are frequent, and it is essential to have enough strength to resist this pressure without bursting. The walls of the muffler may be so designed as to prevent ringing which is really a harmonious vibration of succeeding exhausts. This is sometimes accomplished by lining the outer shell with sheet asbestos, but this may not seem very desirable, as it possesses certain heat insulating qualities.

The final outlet is generally through a pipe of considerably less cross section than the exhaust pipe. This is sometimes flattened so that the gases escape in a continuous sheet. In some cases this is accomplished by a series of small holes in the final outlet or the outer shell.

Cut-Outs

In order to relieve the so-called back pressure of the muffler, cut-outs are sometimes provided, which are placed forward of the muffler or in the exhaust pipe, and permit exhausting the gases directly into the atmosphere, instead of having them pass through the muffler. The general claim for this cut-out is that it adds to the efficiency and power of the engine. However, it has been proven that with a well designed muffler a cut-out is of little value, except that the operator may occasionally listen to the action of the engine.

Pierce Muffler

The Pierce muffler, Fig. 1, consists of two adjacent cylindrical chambers, which communicate through a number of holes in the inner chamber. The outer chamber is divided into three expansion chambers, while the inner member is also divided into three parts, the partitions of each member being pressed steel discs. The gases first enter the inner chamber and pass through perforations into the outer chamber and from this chamber they return to the second portion of the inner chamber and thence into the second expansion chamber, thence through the central member into the third expansion chamber and back into the central member from which they are discharged. This muffler is mounted parallel to the side members of the frame and has cast end plates which have integral brackets for frame mounting. The tubular members and end plates are held together by long tie rods which extend the full length of the muffler.

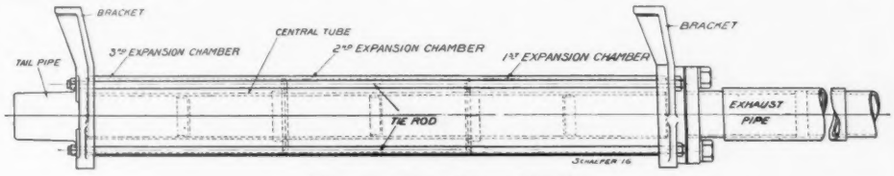


Fig. 1. The Pierce Muffler
Consisting of two adjacent cylindrical chambers which communicate through a number of holes in the inner chamber

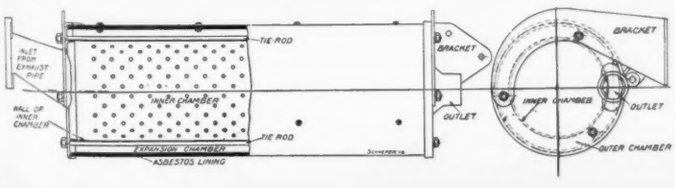


Fig. 2. Packard Muffler
This consists of an inner and outer chamber with cast end plates retained by tie rods.

Packard Muffler

The Packard muffler, Fig 2, also consists of an inner and outer chamber with cast end plates, retained by tie rods. However,

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the necessary volume is obtained by increasing the diameter instead of making the muffler of considerable length. The inner chamber has a series of small holes, through which the gases pass after expanding in the inner chamber. After expanding in the outer chamber they escape at the rear end. This outer chamber is insulated with sheet asbestos retained by plates and small screws to deaden the vibration. The supporting brackets are made of pressed steel and fit into the side members of the frame.

Gray-Hawley Muffler

The Gray-Hawley muffler, Fig. 3, is used on a number of commercial cars and consists of two cast heads which support three cylindrical sheet metal tubes. The gases enter the inner one of the three members from the exhaust pipe. They expand in this chamber and then pass through fine perforations at the opposite end in the partition wall into the intermediate chamber, and thence through similar perforations at the rear end of the innermost portion wall into the outer chamber from which they escape at the further end. The path of the gases is shown by the arrow-heads in this illustration.

United States Muffler

The United States trucks are equipped with the muffler shown in Fig. 4, which is similar to the one previously mentioned. The gases take the same path and are expanded in a similar manner. However, they are discharged through perforations at the center of the outer chamber, as this muffler is mounted crosswise at the rear end of the sub-frame. Into the head, which connects with the exhaust pipe, a cut-out is placed. This cut-out consists of a poppet valve, held to its seat by a spiral spring and is operated by a bell crank pivoting in a bracket through suitable linkage from the operator's seat. When this cut-out is opened by raising the valve from its seat, the greater part of the gases take the path of the least resistance, which is through the valve opening instead of passing through the various expansion chambers.

Riker Muffler

The Riker (formerly Locomobile) muffler, Fig. 5, is somewhat similar to those depicted above, except that the inner chamber is perforated at both ends and the outlet is of a different shape. Both end plates or heads are provided with flat surfaces to which the supporting brackets are bolted. The front head has an opening against which a flat valve is held through the pressure exerted by a coiled spring attached to the end of a bell crank and the head. The bell crank supports the valve, which is raised from its seat when the cut-out pedal is depressed. Both exhaust and outlet pipes are attached to the muffler heads by flanges and bolts.

Powell Muffler

The Powell muffler is also used by some makers of commercial vehicles. This consists of a number of pressed steel cups, the open ends of which are flanged out so as to fit over the closed end of the adjacent section or cup. Each of the cups "A" are perforated and through these perforations the adjacent chambers communicate. Cups "B" and "C" are used at the rear end and

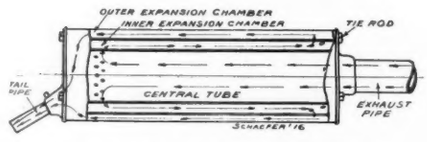


Fig. 3. Gray-Hawley Muffler
Consists of two cast heads which support three cylindrical sheet-metal tubes

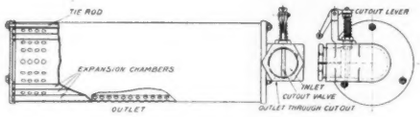


Fig. 4. The U. S. Muffler
The gases are discharged through perforations at the center of the outer chamber

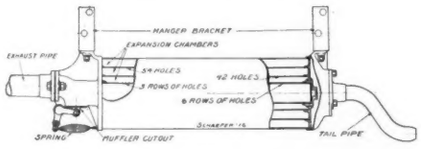


Fig. 5. Riker Muffler and Cut-Out
The inner chamber is perforated at both ends and both end plates or heads are provided with flat surfaces to which the supporting brackets are bolted.

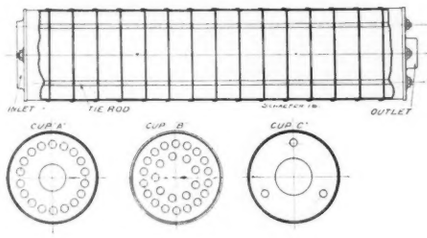


Fig. 6. The Powell Muffler
Consists of a number of pressed-steel cups, the open ends of which are flanged outward so as to fit over the head of the adjacent cup.

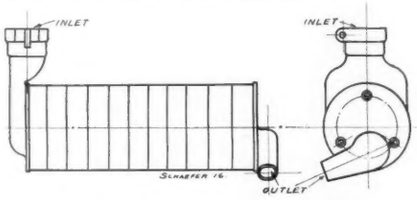


Fig. 7. Knox Tractor Muffler
This is a Powell Muffler as shown in Fig. 6, but is fitted and mounted specially for the Knox

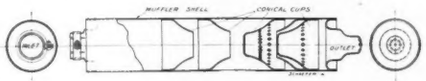


Fig. 8. G. P. & F. Muffler
This is made of pressed steel and is used by the Denby Motor Truck Company. It consists of a number of pressed-steel cups placed in a steel shell and electrically welded.

are so arranged as to form a somewhat tortuous passage for the gases. This is accomplished by a series of small perforations in cup "B," while cup "C" has a large central hole. Three tie rods hold the various sections together, which permits using any number of cups to meet the requirements of each individual engine to which the muffler may be fitted. Fig. 6 shows this muffler as applied to the Mogul trucks, and Fig. 7 illustrates its application to the Knox tractor, in which it is mounted crosswise at the front end of the frame.

Denby Muffler

A pressed steel muffler has recently been introduced by Gueder, Paeschke & Frey Co., which is used on the Denby trucks. This is illustrated in Fig. 8 and consists of a number of pressed steel cups placed in a steel shell and electrically welded. This makes a very light construction and the claim is made that it weighs but 5 lbs. The gases enter at the forward end and pass through conical-shaped cups which are so spaced that an expansion chamber is formed between them. The remaining cups are of similar shape, but reversed in position and also provide limited expansion chambers between them. The first of these is perforated, while the second has but one large central hole, and the third has but half the number of perforations of the first one. The outlet, instead of having one large central opening, is also perforated, so that the gases escape in continuous streams.

Fig. 9 depicts another popular type of muffler known as the "Dunco," which operates on a principle of automatic adjustment which is that of the well-known steam ejector. A portion of the exhaust gases pass directly through a central tube to a high speed jet, at the outlet of that tube, and induce a partial vacuum behind them, thus drawing the remaining gases through baffle plates or cones in the muffler. It is claimed that this muffler is self-adjusting to variations in speed, and the frequency of injector impulses varies directly as the speed of the engine, so that the pull of the ejector is always proportional to the volume of gas to be drawn through and discharged. The heads are malleable castings and tie rods hold the entire construction together, so that it is very simple to take the muffler apart for cleaning.

Maxim Silencer

The Maxim silencer, Fig. 10, incorporates a somewhat different principle in which but one tubular member is used. The interior construction is of a peculiar built whirl chamber, which, it is claimed, can not clog or collect carbon. The gases enter at one end and pass from inlet to outlet

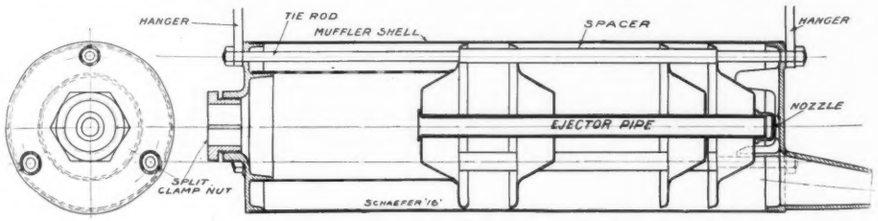


Fig. 9. The Dunco Ejector Muffler
This operates on a principle of automatic adjustment which is that of the well-known steam ejector

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

without obstructions of any kind. This continuous channel has the peculiarity of a circular or helical form, and, owing to the centrifugal force of the fast moving gases, these gases whirl to the outer periphery, traveling an approximate distance of three and one-half times the length of the muffler. Slow moving gases will remain at the center and gradually move forward to the outlet. The heads are malleable, while the shell is made of sheet steel, seamed and electrically welded to prevent bursting.

Oldberg Muffler

The Oldberg muffler, Fig. 11, has a series of expansion chambers. The gases enter the center member and, due to the arrangement of the perforations, immediately start to pass out and around to the opposite side. Each alternate tube is placed eccentrically with respect to the axis of the muffler. The perforations in each tubular member are arranged in two rows throughout their length. The total area of these perforations is greatly in excess of the area of the exhaust pipe connecting with the muffler. The sound waves are interrupted by passing half of the gases around each side of the tubular members, the two streams coming together on the opposite side of the preceding chamber.

The mufflers described above apply to four and six cylinder engines, while Fig. 12 illustrates the I.H.C. construction for their two cylinder engines. It consists of an inner and outer shell with cast heads retained by a single tie rod. The gases enter the outer chamber near its center through exhaust pipes from each cylinder. They expand in this outer chamber and pass through perforations in the walls of the inner member, whence they escape at both ends, as the muffler is mounted crosswise at the rear end of the frame. The outlets and mounting brackets are cast integral with the muffler heads. The end view illustrates the method of retaining the exhaust pipes with packing joints.

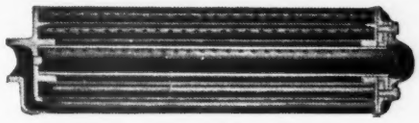


Fig. 11. The Oldberg Muffler
With expansion chambers placed eccentrically

Fig. 10. Maxim Silencer
This incorporates the principle of the Maxim Silencer for firearms

The exhaust system begins with the exhaust manifold of the engine and includes the exhaust pipe, cut-out and muffler. Practice differs with the various makers however. What has been outlined in this and previous chapters on the engine serves to give a general idea of the subject.

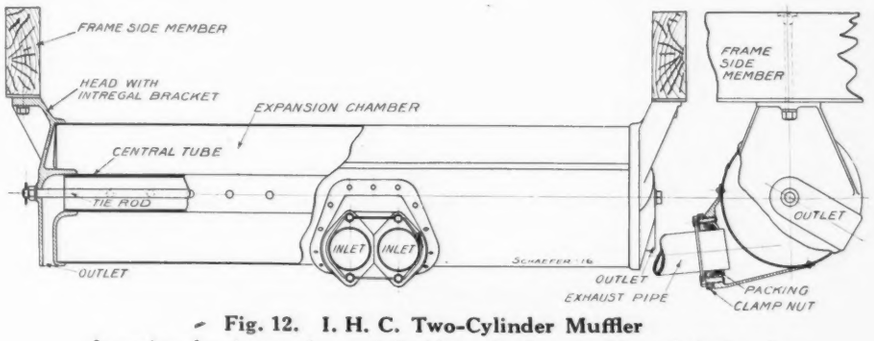


Fig. 12. I. H. C. Two-Cylinder Muffler
It consists of an inner and outer shell with cast heads retained by a single tie rod

NEW TYPE OF RADIATOR USED ON MACK AC TRUCKS

The radiator used on the Mack model AC trucks, built by the International Motor Co., of New York City, is of entirely original design. By the use of a large number of practically semi-circular sections of copper tubes, which are expanded into plates that in turn are bolted to top and bottom headers, a solderless radiator is obtained, which expands within itself and withstands severe vibration without failure.

Both top and bottom headers are of aluminum alloy and the upper header forms part of the cowl, while the lower is part of the frame that supports the radiator. As each tube is a unit in itself, one or more of the tubes can be blocked or pinched off in case of emergency without interfering with the others.

Instead of being placed in front of the engine, the new radiator is installed back of it, and a centrally located fan draws air from the driver's cab as well as the motor compartment, and discharges it at the sides. Thus a constant stream of cool air is passed over the radiator tubes, and, as screens are provided on each side of the hood, cool air is also drawn past the engine.

An illustration of the way tubes of this radiator will stand expansion and contraction without leakage is shown in the case of an AC truck that was left standing outdoors on a very cold day. The water in the radiator was frozen solid, and so great was the strain upon thawing that the lower section of the bottom header burst, yet the tubes remained unharmed. Replacing the broken header was an easy matter. The bolts were removed from the two plates holding the tubes, after which the header was unbolted from the chassis and a new one bolted in its place.

The New Mack Radiator

STUDEBAKER USING SIXTEEN-PASSENGER 'BUS FOR THE CONVENIENCE OF VISITORS

For the convenience of visitors to the factories in Detroit, as well as for interplant trips, The Studebaker Corporation has pressed into service one of its new 1-ton 16-passenger 'buses. The 'bus makes five round trips daily on a regular time schedule, rolling up a daily mileage of 80 miles. The trips are made between plant No. 1 in the north end of Detroit to plant No. 3 in the west end of the city, with stops downtown each way at the various hotels. The operation of the 'bus has relieved the company of the expense of maintaining a fleet of touring cars and drivers for work of this nature.

Boston Public Library is now using commercial cars to distribute books. For some years the work has been growing steadily and the demands for prompter service have increased. In order to keep the reading matter of the thirty sub-branches of the library up to date, it has been necessary to employ a number of horse-drawn wagons. After a conference with the contractor who does the work, he decided to purchase two Autocars. Each truck makes two trips daily to the substations, and the work goes on without interruption.

Gary & Southern Railroad, Gary, Ind., is planning to put motor 'buses in operation between Hosford Park, just outside of the city limits of Gary, and Hammond. This would give passengers from Crown Point a new road for getting to Hammond and would give a new outlet to the southward for Hammond.

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

Mack Three and a Half Ton Chain-Drive Truck

THE International Motor Co., New York City, has put on the market a new model, the 3½ ton chain drive Mack. This truck was exhibited for the first time at the recent Boston show and has many new and original features of design. The front of this truck has a very overseas appearance, having a sloping hood with a radiator within the dash.

Peculiar Radiator

This radiator is a very novel construction, consisting of two semi-circular groups of copper tubing surrounding a central fan throwing its air in a radial direction. Each of these semi-circular groups is independent, having its intake of hot water at the top outlet of cold water at the bottom. The entire construction is simple, not easily damaged, and as the tubes are heavy gage and not rigidly held to each other, the radiator as a whole does not require spring suspension.

The top of the dash forms a tank for an excess of water over what the actual tubes themselves will hold. Pump circulation is employed, the pump being on the right and driven by a cross shaft, the other end of which operates a Bosch magneto. This shaft being spiral gear, connecting to the half-time gears, all gears enclosed.

Novel Engine Details

This engine is a four-cylinder 5x6, cylinders cast in pairs, mounted on aluminum crankcase, three main bearings in the upper half of the case, the lower half being the usual oil pan. This engine follows closely the general design of the new small A. B. 2-ton truck, which has been on the market about a year. This power plant is on a three-point suspension, the forward end being carried in an unusual manner for flexibility. This consists of a cast steel bridge cross-frame member, at the center of which the engine is supported by what amounts to a universal joint, there being two trunnions at right angles to each other in suitable mountings. The rear of the engine is supported on another cast steel cross-frame member bolted directly to the surface of the case, and the ends of the members supported on and bolted through the side frame members of the truck, which are ¼-in. pressed steel channel section, 8 in. in depth. The cross-frame member at the front is unusual in design, and is removable, permitting withdrawing of the engine radiator through the front of the frame. This member consists of a pressed steel piece of channel section curved outward, having a depth of 16 in. at the ends, and being held by four bolts to the forward end of the side frame-members, forming a buffer and protecting the entire front, not only of the engine, but of the forward mounting of the springs. The exhaust manifold of the engine is also a novel construction, having twin passages, one for each of the cylinder castings, which, as before stated, are in pairs, thus providing a free exhaust.

Very Accessible

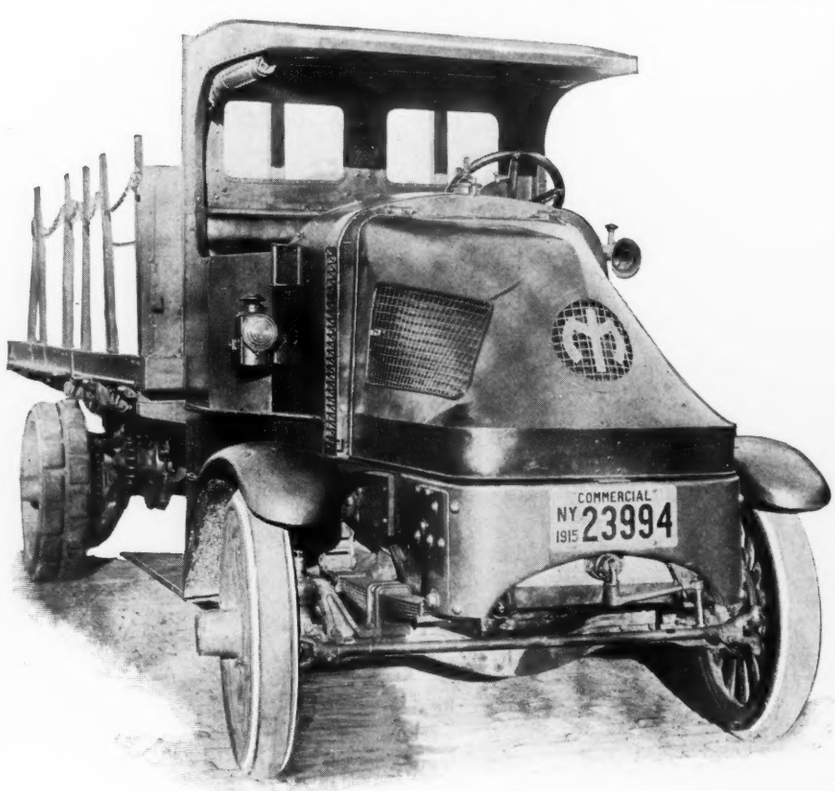
Accessibility of each part has been one of the considerations of the designer of this truck, E. R. Hewitt, who is well known to the trade. On the left side of the case are quickly removable hand hole bolts giving access to the interior, so that any of the bearings can be adjusted. The lower half of the case, when removed, permits drawing out both the connecting rods and pistons without disassembling any of the upper part of the engine.

The crankshaft bearings are 3 in. in diameter. The connecting rod ends are 2⅜ in. diameter, these ends having four bolts set up with a single heavy shim. The rods are 14¾ in. in length, the upper ends being fast to hollow hardened and ground wrist pins, which have their bearing in the bronze sleeve bushing in the piston bosses.

Oiling

The method of lubricating the engine is by a combination of splash and gravity feed. Cast integral with the forward cylinder group is a receptacle on the side fitted with a strainer and with leads to the main bearings and to the gear case at the forward end of the engine. This has a hinged lid, making an oil-tight joint. Into this is poured the oil which feeds by gravity to the main bearings the excess forming a splash pool in the case to be scooped by the projections on the ends of the connecting rods.

The gear oil pump is skew gear driven from the camshaft on the right of the engine. This forces the oil, after double



Front View of Mack Truck

Note novel appearance of hood and fenders. This is almost unique in the commercial car field

The CCJ has most readers because it gives most information

straining, back into the small tank on the side of the engine, from which it again flows by gravity. This location of the tank warms the oil rapidly when starting, and afterwards holds it more or less at uniform temperature, due to the fact that one side of the case is against the cooling jacket of the cylinders.

Bosch ignition is employed, with separate generator for starting. The crankshaft is twenty-point carbon steel, case hardened all over, the bearing surface being ground to a finish, giving a glass hard surface at these points of excessive wear, which has proved very satisfactory in tests on the road covering over 12,000 miles. The flywheel is attached at the rear by eight bolts to an integral flange of the crankshaft. This flywheel encloses the three-plate clutch consisting of steel plates faced with Raybestos, and operating dry. External adjustment by means of two bolts in non-concentric slots is provided, making it easy to take care of the tension on the clutch spring, which is a coiled spring around the clutch shaft.

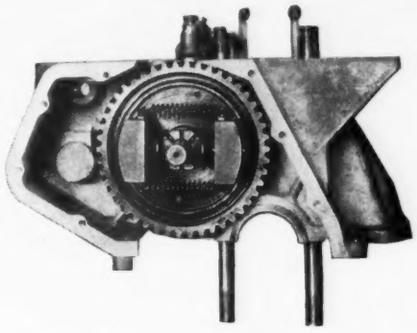
The control pedals and steering wheel, with slanting post, 20 in. diameter, are at the left, spark and throttle on top, with an accelerator pedal between the clutch and brake pedals.

The fly wheel is under the center of the radiator in the dash, and drives the fan by means of a V motorcycle type belt operating in an integral groove in the fly wheel.

Drive is by shaft, with two Spicer universal joints to the sliding gear transmission at the middle of the chassis. This provides three forward and one reverse speed, and carries the jackshaft at its rear end. This transmission and jackshaft are also three-point suspended. The case at the forward end, on a swivel, supported from the cross-frame member and the outer ends of the jackshaft are supported by special fixtures on the under side of the frame.

Gear Shift Unusual

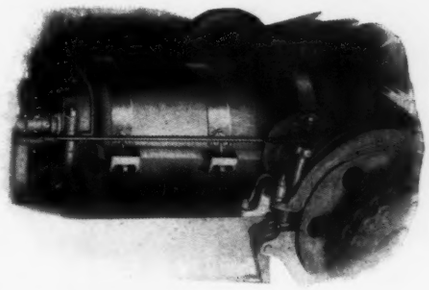
The gear shift arrangements are somewhat different from the ordinary, the selector part of the mechanism being, not at the gear shift lever, but inside of the transmission case itself. The ordinary ball top lever, swinging to the right and left, forward and back, is connected by a crank at the lower end of the gear shift rod, which runs back to the case. By swinging the lever this rod, by means of a crank at the end, is oscillated. Its end in the transmission case carries a short, vertical cross-arm, which, when the rod is rotated, first strikes a pin, which unlocks the shifter yoke, and then passes into a slot in this yoke, so that any longitudinal motion of the rod shifts the gears. When rotated in the opposite direction the same thing takes place on the other side. It is impossible to get two gears in at once, and as this selector mechanism is in the transmission case, it is not affected by tortional strains or weaving of the frame due to road inequality.



Mack Governor

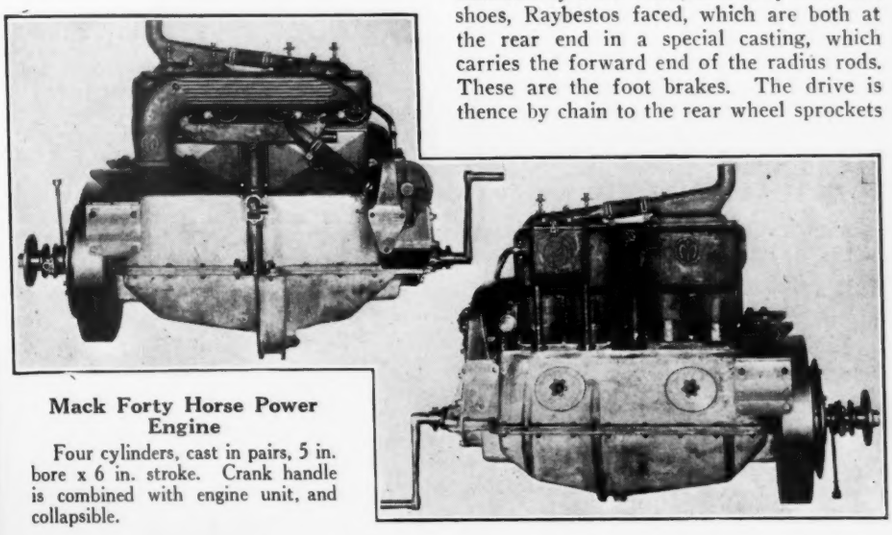
This is built into the engine with only one corner between the action of the governor and the operation of the shut-off valve in the inlet manifold.

The mounting of the roller bearing cages is in steel collars, into which they are screwed, these collars being held to the aluminum case by being pinned. The lower half of the case is a pressed steel pan, held by quickly removable steel traps, so that it can be instantly dropped down for accessibility. The bearings are but 10⅜ in. apart on the main shaft, making it very rigid. The lay shaft of nickel alloy steel is 11⅜ in. between bearings, the forward end of this shaft extending 5½ in. beyond the outside of the gear box, so that it is a simple matter to attach automatic driving devices for winches, pumps, body dumping mechanism, etc. The cast steel drums at the ends of the jackshaft are 15 in. in diameter by 3 in. width, and carry two steel shoes, Raybestos faced, which are both at the rear end in a special casting, which carries the forward end of the radius rods. These are the foot brakes. The drive is thence by chain to the rear wheel sprockets integral with the emergency brake drums, which are bolted through the wheels. These rear wheel brakes are 20 in. diameter by 3 in. face, and are of internal expanding type Raybestos faced.



Mack Transmission Cover

Accessibility has been accomplished by having the lower half of the transmission cover removable. This is quite an unusual feature, and the car can be operated and the operation of the gears watched without disturbing anything except the straps which hold the cover.

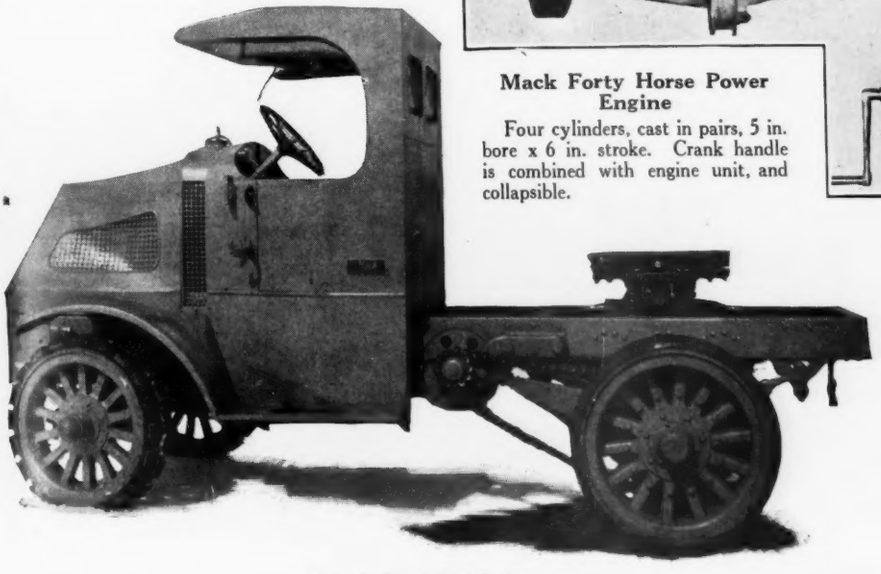


Mack Forty Horse Power Engine

Four cylinders, cast in pairs, 5 in. bore x 6 in. stroke. Crank handle is combined with engine unit, and collapsible.

The brake adjustments are unusually accessible, being all hand star wheels, where they can be easily reached. The foot brakes are operated through a cross-frame equalizer at the front, and the rear wheel brakes have a single-tree type equalizer.

A feature of the drive is the fact that the thrust of the rear wheels is delivered by the radius rods directly to the special steel fixtures on the side of the frame, and not in any way transmitted to the jackshaft. The forward ends of the semi-elliptic



Mack Model AC Tractor

Showing the fifth wheel or universal connection for attaching the trailer

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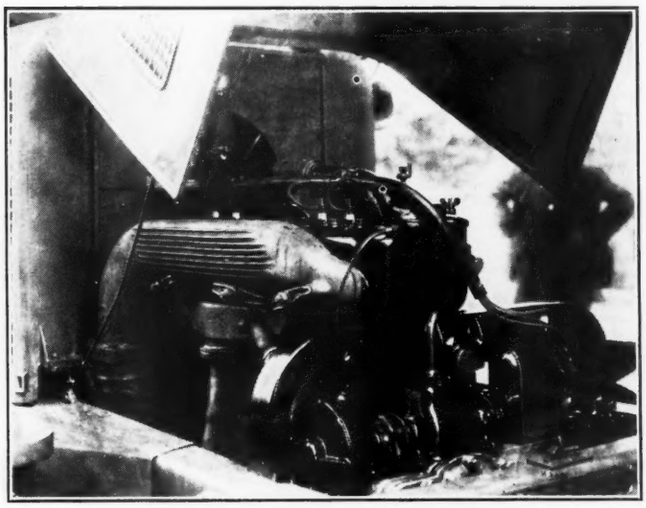
underslung springs are carried in an entirely separate fixture on the under side of the frame, on the ends of a shaft crosswise of the frame, and reaching from spring to spring. The rear ends of the spring are shackled to a similar shaft mounted in special steel hangers from the underside of the frame.

All the castings are electric furnaced steel. Pressed steel is used wherever possible, the seat being of this material.

A novel construction is also shown in vertical sliding door for the protection of the driver, arranged to disappear when let down in a similar manner to car windows.

The cab top is also of pressed steel, and bolts directly to the seat framework.



Right Front View of Mack Engine

Showing unusual front support in three-point suspension system, multiple exhaust manifold and cross lay shaft for pump and magneto.

This same truck is not only being made in 3½-ton size, but also in 5½ and 7½-tons, with three wheelbases for each size, namely, 156 in., 168 in. and 180 in., and in addition are made as short wheelbase tractors, having 9 ft. 11 in. wheelbase in the same three sizes.

Tire equipment for the three sizes is as follows: 3½-ton front 36x5 single, rear 40x5 dual solid or block; 5½-ton front 36x6 single, rear 40x6 dual solid or block; 7½-ton front 36x7 single, rear 40x7 dual solid or block.

Prices of the new models are as follows: 3½-ton, $3400; 5½-ton, $4000; 7½-ton, $4500, f.o.b. factory, Allentown, Pa.

Kelly-Springfield Adds Two Worm-Drive Models, the K-32 and K-36

A RECENT announcement by the Kelly-Springfield Motor Truck Co., of Springfield, Ohio, discloses two new models, known as the K-32 and K-36, having capacities of 1½ and 2½ tons respectively. These new models are equipped with worm drive, and resemble each other in many details.

Model K-32, One and a Half Ton

This model has four cylinder engines, bore 3¾ in., stroke 5¼ in., cylinders cast in block, A. L. A. M. rating, being 22.50 h.p. Piston displacement is 231.9 cu. in. Crankshaft is 40-point carbon steel, triple heat treated. Valves are enclosed, and cylinders are of cast iron and are carefully tested. Three point mounting of engine. Lubrication is by self-contained automatic system, circulated by spiral gear-driven pump in crankcase base. Cooling is by water, circulated by centrifugal pump driven by spiral gears off camshaft. Radiator is honeycomb type, mounted at dash, and cooling is assisted by belt-driven fan. The carburetor is a Rayfield model GL2, ignition by Eisemann magneto. Drive is through the cone to main shaft, through transmission to propeller shaft, and thence the worm-drive rear axle and differential to wheels. Transmission is selective type, three speeds forward and one reverse.

Control

Steering is from left side, with emergency brake and gear shift levers in the center, or on driver's right. Foot pedals operate brake and clutch. Steering gear is worm-gear type, wheel being 18 in. in diameter.

Frame is of pressed steel channel section of 7/32, 30 point carbon steel. Frame has three cross-members of same material and size, and are hot riveted.

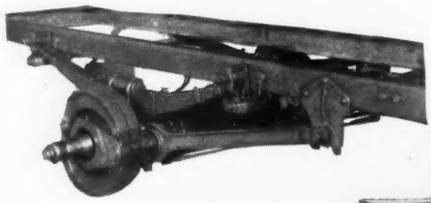
Both front and rear springs are semi-elliptic, high-grade alloy stock. Front axle is "I"-beam section, one piece drop-forging. Taper roller bearings are used.

The rear axle has Timken David Brown worm. Driving stress is taken by radius rods, torque reaction through the springs. This construction is claimed to furnish a flexible drive, cushion the shock of starting and braking, and preventing tendency of springs to creep in their seats.

Brakes

Both sets of brakes are internal expanding acting on wheels. They have few parts and are liberal surfaced. Wheels are artillery type, S.A.E., of second growth, hickory. Tires are 36x3½ in, solid on front, rear 36x5 in. solid. Optional equipment can be had at extra cost.

Standard wheelbase is 120 in., optional, 144 in., 168 in., and 180 in. Tread 56 in. front; 60 in. rear. Optional front, 60 in. Equipment includes three oil lamps, Stewart Warning Signal, tools, jack, Veeder Hubodometers, fenders for front wheels, and running boards.



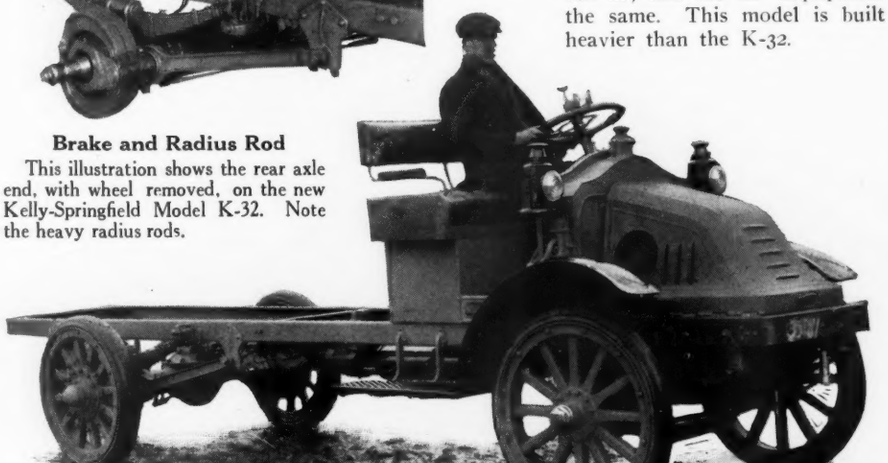
Brake and Radius Rod

This illustration shows the rear axle end, with wheel removed, on the new Kelly-Springfield Model K-32. Note the heavy radius rods.

Model K-36, Two and a Half Ton

This model resembles the K-32 in most of its specifications, the differences only being noted herewith.

The steering wheel is 20 in. in diameter and frame is stronger. Front tires are 36x4 in. solid on front and 36x4 in. dual solid on rear. Standard wheelbase is 144 in.; optional 120 in., 168 in., and 180 in. Equipment the same. This model is built heavier than the K-32.



New Kelly-Springfield Worm-Drive Chassis, Model K-32

This is the smaller of the two new worm-drive models known as the K-32. It has worm drive, four-cylinder engine, 3¾ x 5¼ in. Drive is taken through radius rods

The CCJ leads in circulation, advertising and prestige

The Atlas One Thousand Pound Commercial Car, Model 16

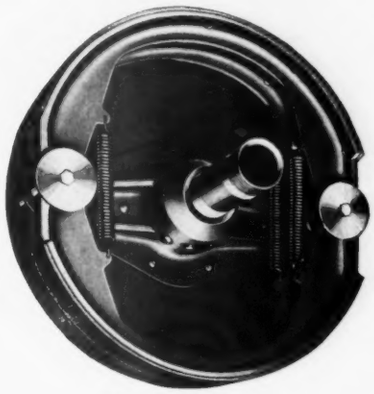
THE Atlas Commercial Car is manufactured by the Martin Carriage Works, factory and main office, York, Pa. This firm was organized in 1885 for the purpose of building horse-drawn commercial vehicles, and grew to such an extent that they have been acknowledged the largest builders of vehicles in the world. Some nine or ten years ago they built a two-cylinder commercial car; then a year later began the building of Motor Driven Fire Apparatus. In this line they have been most successful, building Combination Hose and Chemical Trucks, straight hose and straight chemical, also triple combinations, with pumps of capacity from 300 gals. to 800 gals. per minute.

August 1st, 1915, the Atlas Commercial Car was put under way. Past experience in motor truck construction has taught this concern that the best materials and a factor of safety in oversize are very essential for the success of a commercial car.

The large variety of commercial bodies built by this company for other makes of cars are also suitable for the Atlas, making a total of twenty-five or more styles to select from.

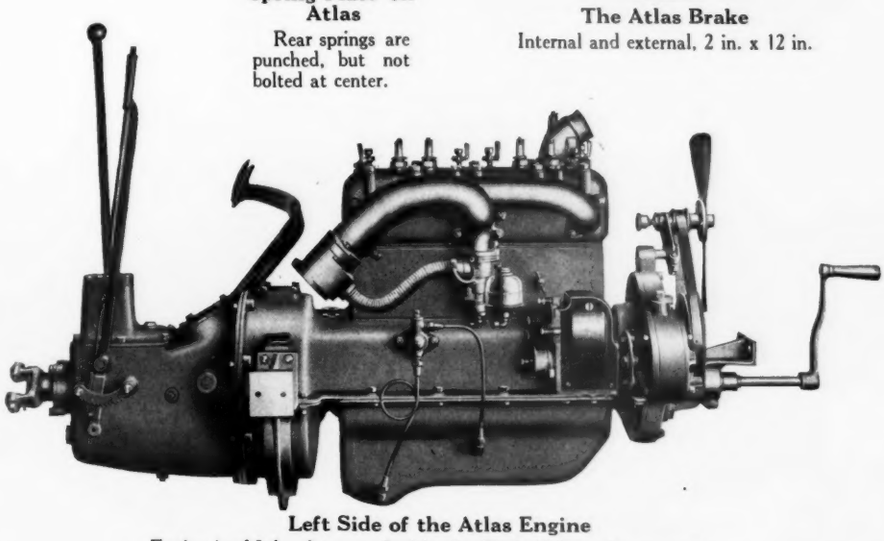
Spring Plate on Atlas

Rear springs are punched, but not bolted at center.



The Atlas Brake

Internal and external, 2 in. x 12 in.



Left Side of the Atlas Engine

Engine is of L-head type. Ignition by Dixie high-tension magneto

Chassis Details

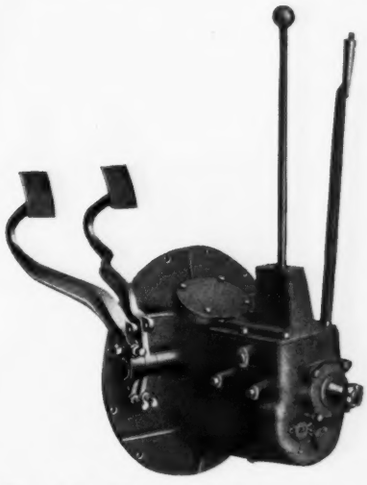
The four-cylinder engine of 3¼x5 in. bore and stroke will deliver 28 to 30 h.p. brake test. Brief specifications are: Detachable head, integral camshaft, helical timing gears, valves enclosed, I-beam connecting rods, 40 carbon steel double heat treated, 1⅝ in. valves, 45 degree seats, heads cast iron, electrically welded to high carbon steel stems, with 1⅜ in. lift, lubrication splash, constant level system plunger pump, thermo-syphon cooling, three-point suspension. Ignition Dixie high tension magneto. Carburetor Carter glass float chamber, dash adjustment. Hot air connection from a special designed stove. Radiator double end tube, ample capacity.

Transmission is of selective type, three-speed, special heavy duty truck pattern, full roller bearing equipment. 13-16 in. face gears, 1¼ in. main shaft, designed for capacity up to one ton. Clutch dry plate, specially designed for truck service with graphite filled bearings. The construction is such as to permit of these bearings being lubricated without tearing down the clutch.

The differential is of Brown-Lipe type with spiral cut gears. Bearings are Bower Roller and Gurney thrust.

The rear axle pressed steel housing is of such size and capacity designed for cars weighing up to 2800 lbs., that it requires no truss-rod.

The front axle is oversize, the I-beam section 2⅜x1½x¼ in., ¾ in. cross rods, 1⅛ in. steering arm ball, ⅝ in. King bolt, 1⅜ in. spindle, 6 in. knuckle, designed for cars of 1 ton capacity.

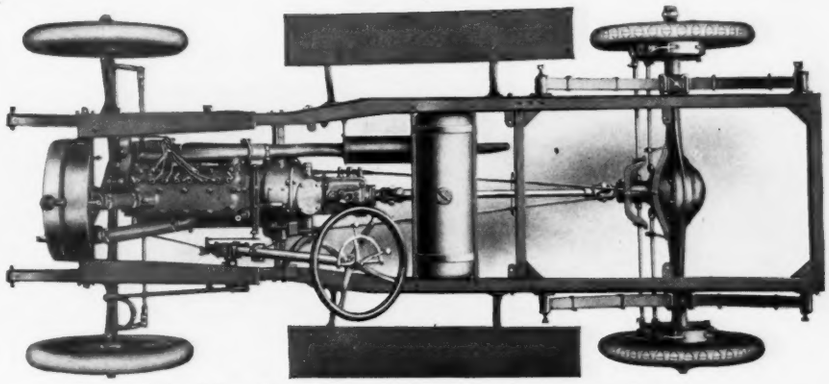


The Atlas Clutch and Transmission

Brakes are 12 in. in diameter, 2-in. face, internal and external type.

The springs are 2x36 in., seven leaves, front; 2x46 in., 10-ply, rear, no bolt through rear spring at center.

The spring plate is especially well built. It is cast with webs at top and heavy ears between clips on either side. Well designed



The Atlas One Thousand Pound Chassis, Top View

Four-cylinder engine, 3¾ in. bore, 5 in. stroke; cast in block; thermo-syphon cooling; three-speed transmission; multiple-disc clutch; Lavine steering gear; wheelbase 106 in.; 30 x 3½ in. tires. Price of chassis, $660.

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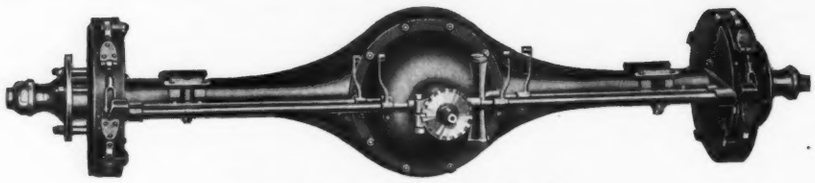
spring clips are used, which will not permit of the spring giving at this point.

The Lavine steering gear of split nut construction is used. The wheel is 17 in. double control and large enough for a 1-ton truck. The side frame members are 3-16x4x2½ in., at offset 2⅞ in. deep.

The wheelbase is 106 in. Tread 56 in. Tires 30x3½ in. non-skid on rear, demountable rims, with spare rims. Standard color, red wheels, black chassis. All spring bolts have grease cups. Steering gear attached to engine by special heavy bracket from engine hanger, no connection to dash or floor. Foot accelerator and throttle connections all attached to engine, making a clean, neat unit power plant. The rear hanger encircles the engine, giving the proper support without extra strain on crankcase. The front hanger is adjustable to properly fit engine shaft. The gas tank is attached to frame on angle iron support. The body is attached by six large bolts, allowing it to be removed in a few minutes.



Rear Axle of the Atlas Truck

Body Prices

The list price of chassis is $660; complete car with six-post body, No. 915, $730; with cab seat body, No. 926, $722.50; with oval window panel body, No. 924, $732.50, and with square window panel body, No. 914, $730.

Superior Trucks, in Two Models

E. G. Willingham's Sons, Atlanta, Ga., has announced the Superior truck in two capacities, the model A being rated to carry a load of 1 ton, the model C carrying 2 tons.

Superior Model A

The price of this model is $1350 for the chassis. Chassis weight is 2680 lbs., body allowance 700 lbs., maximum body length 118 in., wheelbase 124 in., and tread 56 in.

The engine has four cylinders, cast in block, valve-in-head type, 3½ in. bore and 5 in. stroke. The cylinders are offset to give long power stroke. The engine is suspended at three points. Engine speed is controlled by a Kraver governor and the carburetor is a Stromberg. The throttle is operated by means of a foot accelerator only.

Ignition is furnished by an Eisemann high tension magneto with fixed spark. Engine lubrication is effected by oil drawn from the crankcase reservoir by gear pump and forced to the main bearings and a constant level splash overflowing back to reservoir.

The cylinders are cooled by water which in turn is cooled in a vertical flat tube radiator, the circulation being thermo syphon principle.

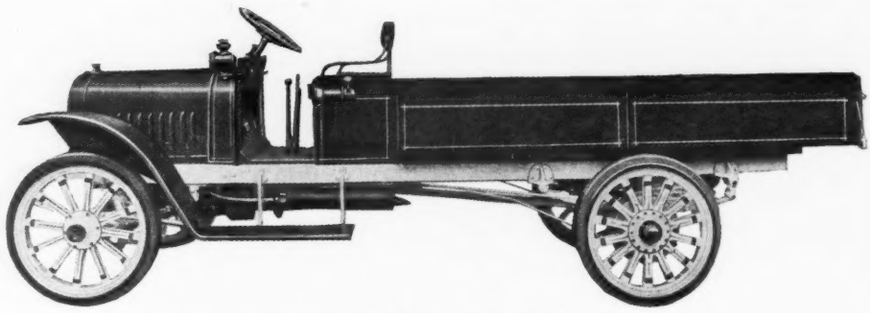
Fuel is contained in a 15 gal. round tank under the seat. This tank is strapped to the frame and there is a gasoline filter and separator in the gasoline line, also a sediment chamber in the tank.

Clutch and Transmission

The clutch is of multiple disc, dray plate type, steel and Raybestos faced. Transmission is selective sliding type, three speeds forward and reverse with center control. Clutch and transmission form a unit power plant with the engine.

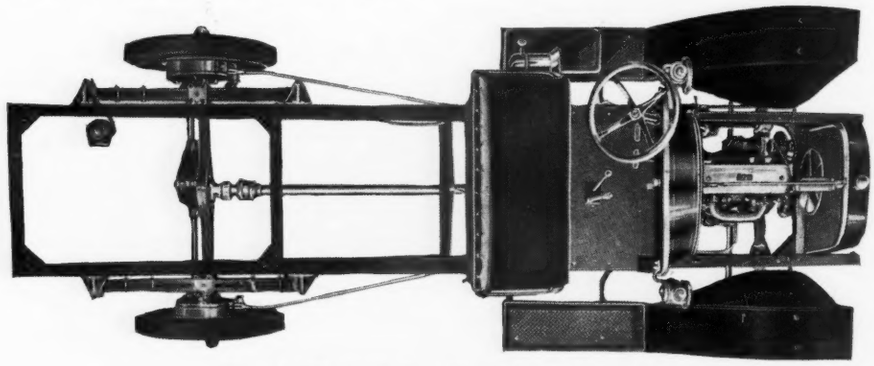
Internal-Gear Drive

Driving-shaft is tubular with grease and dust-tight universal joints. The rear axle is of I-beam section which carries the load, the drive being by internal gear in the rear and delivering power to dust-tight internal gear secured to the road wheels, which are mounted on Bower roller bearings. The shaft is Tusco steel. Gear ratios are: 1st speed 21:1, 2nd speed 12:1, 3rd speed 7:1, reverse 24:1.



Superior One-Ton Truck

Side view fitted with flareboard body. Drive is by shaft to internal-gear rear axle. Price, $1350 for chassis only



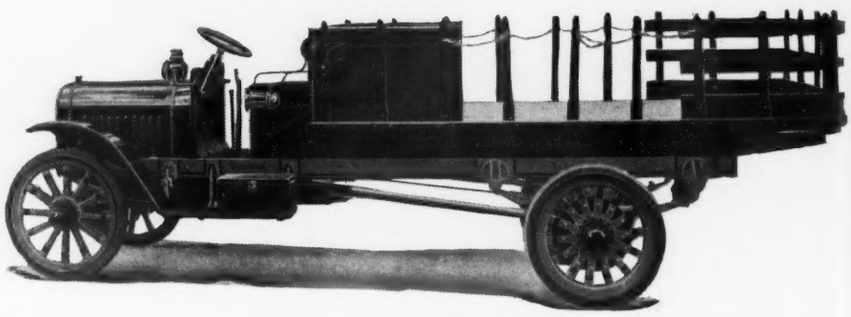
Chassis Plan of One-Ton Superior Truck

Showing disposition of various units and the internal-gear drive rear axle

Brakes, Springs and Wheels

All brakes are on the rear wheels and are faced with Raybestos. Service brake is 15 x 2½ in., emergency 14½ x 2 in.

Springs are of alloy steel, double heat treated. Front are 38 x 2 in.; those in the rear are 44 x 2½ in. These are a special design without center bolt.



Superior Two-Ton Truck

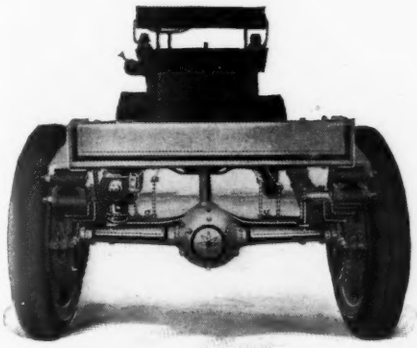
Shown fitted with stake body. Wheelbase is 144 in.; valve-in-head engine, and internal-gear drive. Price is $1800 for chassis only

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

Wheels are Schwarz artillery type with twelve spokes front and fourteen rear. Tires are 34 x 3½ in. front, 34 x 4 in. rear. Firestone is standard equipment.

Other Details

Front axle is I-beam cross section with 3½ per cent. nickel steel spindles and Bower roller bearings.



Rear of Superior Two-Ton Truck
Showing internal-gear drive axle, sturdy springs and shackles, and other details

Standard equipment includes driver's seat and cushion, front fenders, running boards, two side oil lamps, one oil tail-lamp, Clero horn, jack, tool kit and tool box.

Model C, Two-Ton Superior

The chassis weight of this model is 3680 lbs., body allowance 1000 lbs., maximum body length 144 in., wheelbase 144 in., tread 56 in.

The engine on this model has a bore of 3¾ in., the stroke being the same as the other model—5 in. A pump is used on this model to assist in the circulation of the water.

Gear ratios are: 1st speed 24:1, 2nd speed 15:1, 3rd speed 8:1, reverse 28:1. Service brake is 18 x 3 in., emergency 17½ x 2½ in. Front springs are 38 x 2¼, rear 52 x 3 in. Front tires 36 x 4, rear 36 x 6, with either Goodyear or Firestone tires.

Other chassis details are the same as for the 1-ton model.

THE OLD HICKORY 1250 POUND DELIVERY CAR, $785

The Kentucky Wagon Mfg. Co., Louisville, Ky., is producing a 1,250 lb. model, which is fitted with a flareboard body with drop end gate and which is listed at $825, f.o.b. Louisville; chassis only, $785.

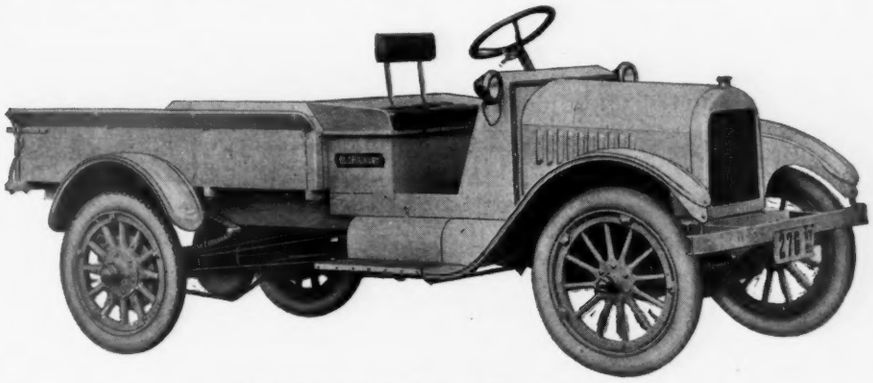
Engine

The engine is a Lycoming model TU, 3¼ in. bore, 5 in. stroke, cylinders cast in block. Starting and lighting is provided for by a Dyneto size A single unit motor-generator. Cooling is by thermo-syphon system, the water circulating through a honeycomb radiator which is supported on springs.

Wheelbase is 110 in.; tires 33 x 4 in., with non-skid on rear wheels, one extra tire complete and tire carrier, four demountable rims on car and one extra; rolled channel steel frame, bevel gear drive rear axle, ratio 6:1, Hyatt roller bearings, I-beam drop forged front axle with ball bearings, selective sliding transmission, three speeds forward and reverse, nickel steel gears and ball bearings, control levers in center, worm and gear steering gear with 18 in. wheel, internal and external brakes on rear wheels, complete equipment including electric horn.

STEWART TRUCK, ONE AND A QUARTER TON, NOT ONE TON

In the COMMERCIAL CAR JOURNAL of March 15, the paragraph in connection with the Boston exhibit of the Stewart Motor Corp., of Buffalo, N. Y., contained several errors, due to misinformation given our representative. The following is the correct information: This company is producing a 1¼-ton truck, not a 1-ton truck. This sells at $1390, which, it will be seen, is less than the average price of the usual 1-ton truck. The 1000 lb. panel delivery car sells at $795 and the chassis at $695, the low price of this 1000 lb. delivery truck being a feature of the company's product. They also make a 1500 lb. panel delivery, selling at $1540, or a chassis, price of $1290.



Old Hickory 1250 Pound Flareboard, $825
Wheelbase 110 in.; tires 33 x 4 in.; three-speed sliding transmission; four-cylinder engine, 3¼ x 5 in.; thermo-syphon cooling; electric starting and lighting; loading space 6 ft. 6 in. x 3 ft. 6 in.

Mercury Type U Dock Tractor
Price, $1550. Has front tires 22 x 3½ in. and rear tires 27½ x 4½ in.

G. V. Electric Sprinkler
A three and a half ton electric, made by the General Vehicle Company, Long Island City, N. Y. This is used in one of the suburbs of London, Eng. The tank holds a thousand gallons

Mercury Type Z Industrial Tractor
Just installed as standard for the Illinois Central Railroad after a six-months' competition. The price is $980. Has three forward speeds, 41 in. wheelbase, 15 x 3½ in. tires in front, and 20½ x 3½ in. tires in rear.

Jeffery Rapid-Service Wagon and All-Purpose Truck

By HERBERT L. CONNELL

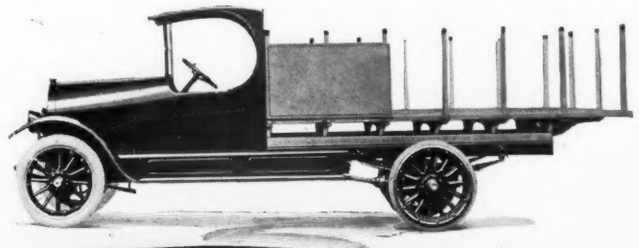
A RAPID-Service Wagon and an All-Purpose Truck have been added to delivery line of The Thomas B. Jeffery Co., of Kenosha, Wis., and the famous Quad has been refined and strengthened. The names of these two new jobs are unusually descriptive of their speed, field and capacities, for the first is intended for speedy light delivery service with loads not over 1,500 lbs., while the second has a maximum carrying ability of 3,000 lbs. and is governed to 16 m.p.h. On the four-wheel-drive Quad the rating of 4,000 lbs. capacity has been retained, but the power has been slightly increased and the frame trussed to take care of the overloads to which these trucks are so often subjected, due to their unusual pulling powers.

Little difference is exhibited in the power plants of the two lighter models, these following the principles which Jeffery has proven out for several years. The engines are block cast with a bore of 3¾ in. and the valve chambers are on the right side. On this side are also the carburetor and the two manifolds. A stroke of 5¼ in. gives a piston displacement of 232 cu. in. and an N.A.C.C. h.p. rating at 1,000 ft. per minute, or in this case 1,143 r.p.m. of 22.5.

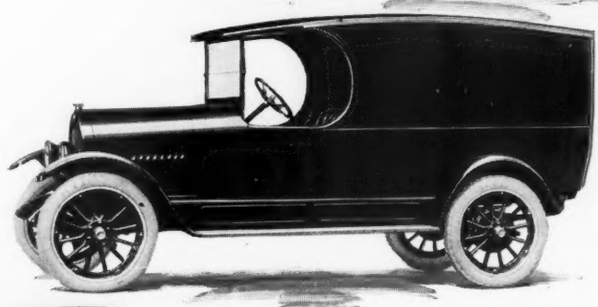
Electric Starting

Time is one of the big factors in quick delivery service and for this reason both these cars are provided with Bijur starters and generators as standard equipment. Of course, this also means that electric lights are furnished throughout. The generator is driven by a gear meshing with the camshaft drive, while the starting motor is bolted to the flywheel housing on the left side. Forward of the starter, and receiving its drive from the front, is a high-tension magneto, then comes the centrifugal water pump and the belt pulley for the fan.

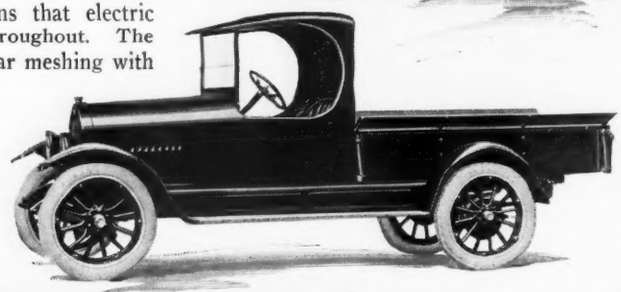
From the bell housing over the flywheel there are two feet which extend to the frame, and the third point of the suspension attaches the power plant to the frame cross member just back of the radiator. Three plain bearings carry the crankshaft in the upper half of the crankcase. As is now common practice, the lower half of the case is removable with the engine in the car and contains the splash troughs and the oil reservoir. Oil is first sent to a sight feed on the dash and then goes to the main bearings, front end gears and splash basins, and then the excess drains back into the reservoir, this giving a combined force and circulating splash system. It is worth noting that the combined breather and oil filler on the left of the engine is brought up high enough on the engine so that filling is unusually easy with little excuse for slopping the oil around.



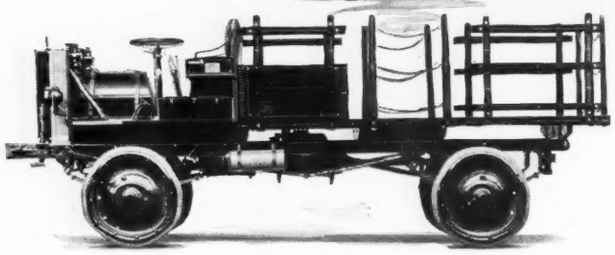
All-Purpose Truck With Stake Body, $1535



Fifteen Hundred Pound Panel Body



Open Express Body on Light Delivery Car



Quad Fitted With Stake Body, $3000

Transmission and Brakes

Regular Jeffery practice is followed through the transmission system. The first step is through the dry plate clutch, two of the four surfaces of which are covered with brake lining. Next comes the conventional three speed forward and reverse gear set, while directly back of this is the emergency brake. This location of the brake is peculiar to Jeffery construction; its worth has been well proven by its use on all models of this make for several years. It is claimed that its position keeps the brake in the best possible condition for the infrequent use to which the emergency band is subjected. This brake is of the contracting type and the linkage to the hand lever, located at the side of the gear set case, is extremely simple and direct. The adjustment is also very easy, being accomplished by a hand wheel at the left which lies directly below the floor boards.

Since Hotchkiss through the springs drive is employed on both jobs, the propeller-shaft is open with completely enclosed universal joints at each end. With the rear universal joint, however, the similarity between the two models ceases. On the Rapid-Service Wagon the rear axle is of the semi-floating pattern with a malleable iron central casing, seamless steel tubes and taper roller bearings, all of which is again well established Jeffery practice.

For high speed work, such as is demanded of a car in the 1,500-lb. class, pneumatic tires are now conceded to be essential to low mechanical upkeep cost and this car, therefore, carries 35 x 4½ in. tires of this type both front and rear. On the 3,000-lb. truck the standard tire equipment is 34 x 4½ in. pneumatics in front and 34 x 5 in. solids in the rear. Solid tires will be furnished in front if desired, but this is not recommended by the company.

Internal-Gear Drive

In order to obtain the larger gear reduction and greater strength demanded in the All-Purpose Truck, as compared with the

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1,500-lb. wagon, the internal gear drive system has been chosen for this model. This has an I-beam dead axle of drop forged steel in front of which lies the live portion of the axle. In the latter is incorporated the M. & S. locking differential, which has been a feature of the Jeffery Quads for some time. This differential is made up of a nest of spiral gears and has the peculiarity of preventing one wheel from spinning when there is a difference in the traction encountered by the two drivers.

So far as the general dimensions and prices go a comparison of the two models can best be made by a study of the following table:

	Rapid-Service Wagon	All-purpose Truck
Maximum capacity	1,500 lbs.	3,000 lbs.
Wheelbase	116 in.	130 in.
Chassis weight	2,700 lbs.	3,250 lbs.
Frame channel	2½x5x3-16 in.	2½x5x¼ in.
Springs—Front	.39x2¼ in.	35x2¼ in.
Rear	.52x2½ in.	56x2½ in.
Gear ratios:		
High	4½ : 1	7 : 1
Intermediate	8.2 : 1	13 : 1
Low	13.6 : 1	22.5 : 1
Reverse	19.4 : 1	25 : 1
Length over all	170 in.	200 in.
Rear of driver's seat to rear of frame	70 in.	100 in.
Road clearance	10 in.	10 in.
Diam. turning circle	41 ft.	54 ft.
Chassis weight	2,700 lbs.	3,250 lbs.
Body weight allowance	....	900 lbs.
Chassis with driver's seat, windshield, etc.	$900	$1,400
With panel body	$1,000	.....
With open express body	$995	.....
With stake body	....	$1,535

Governor

One of the special features emphasized by the makers, along with the internal gear drive and the M. & S. differential is the Duplex governor used on the All-Purpose truck. This receives its name from the fact that it is driven by both the engine and the gear set. In case the car is running on top gear the car speed controls, this being set to 16 m.p.h. When on the lower gears the engine speed is the limiting factor, the governor being set to allow the engine to operate at a higher speed than when running on high gear.

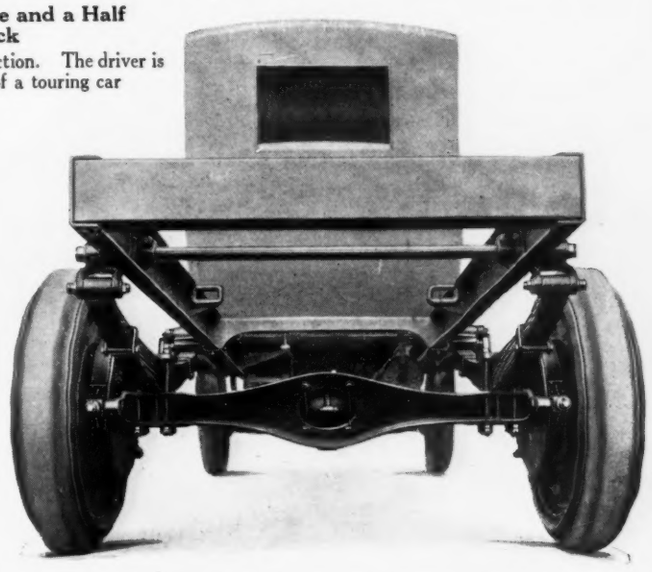
So much has been written and pictured of the Jeffery Quad that it is unnecessary to repeat its details of construction. In review, however, it may be said that this truck was first developed for army work and then placed upon the market as a commercial 2-ton truck, its main features being the driving and steering through all four wheels. Four speeds forward are provided and the drive is carried to each axle by shafts. The weight is supported on solid axles, the steering and drive being taken care of by internal gears in the wheels and universal joints in line with each king pin. In the live part of both axles is an M. & S. differential, which as mentioned in relation to the All-Purpose model, is made up of spiral gears, having the ability of locking when uneven resistance is encountered while the action is as usual in turning corners.

Front of Jeffery One and a Half Ton Truck
A new idea in truck construction. The driver is given all the comforts of a touring car

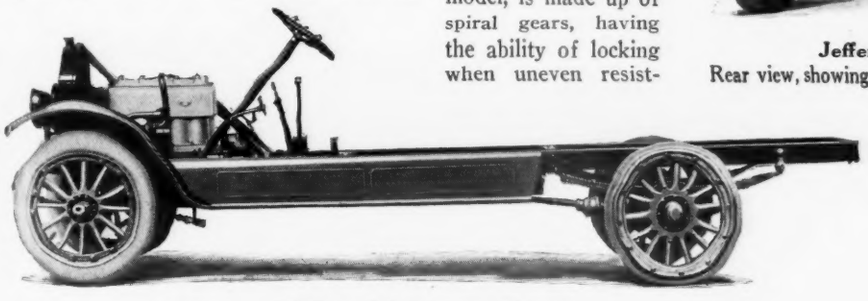
No change in principle has been made in any of the units of the new series Quad, the most marked change being the increase of the engine size from 3¾ x 5¼ to 4½ x 5½ in. bore and stroke. Since the four-wheel drive gives the truck unusual tractive powers it has been found that owners are very prone to exceed the 2-ton rating and to take care of this abuse the frame members have been increased in thickness from 3-16 to ¼ in. and a truss rod has been run under each side rail from the front spring rear hanger to the rear spring front hanger. Due to the larger engine the water capacity has been increased from 8 to 11 gals.

Prices

In the matter of price the standard chassis has been increased from $2,750 to $2,850. Last year the equipping of the engine with a starting and lighting set increased the cost $250, while on the new truck a complete Bijur system will be furnished at an extra charge of but $100. Thus with electrical equipment this year's truck is $50 less than last year's model with the same equipment. With an open stake body the standard job lists now for an even $3,000.



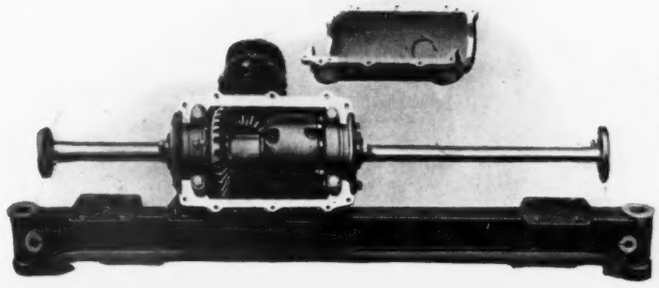
Jeffery One and a Half Ton Model
Rear view, showing internal-gear drive rear axle and spring construction



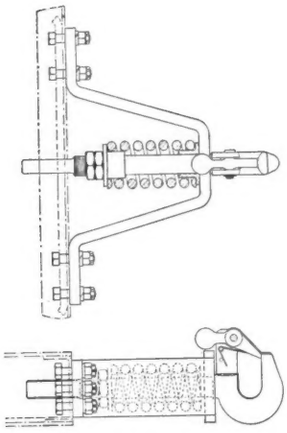
Jeffery All-Purpose Chassis
Side view, showing pneumatic tires in front and solid tires in rear

Towing Hooks

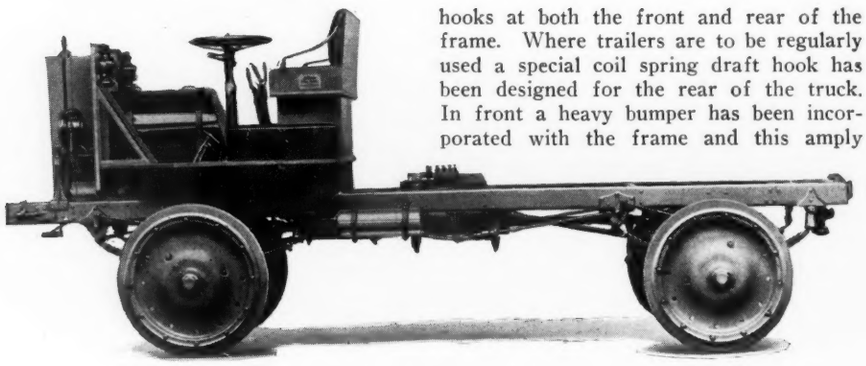
Among several small refinements, which have been made, is the placing of tow



Quad Axle Assembly
The drive is carried from ends of these shafts to the wheels by universal joints and internal gears.

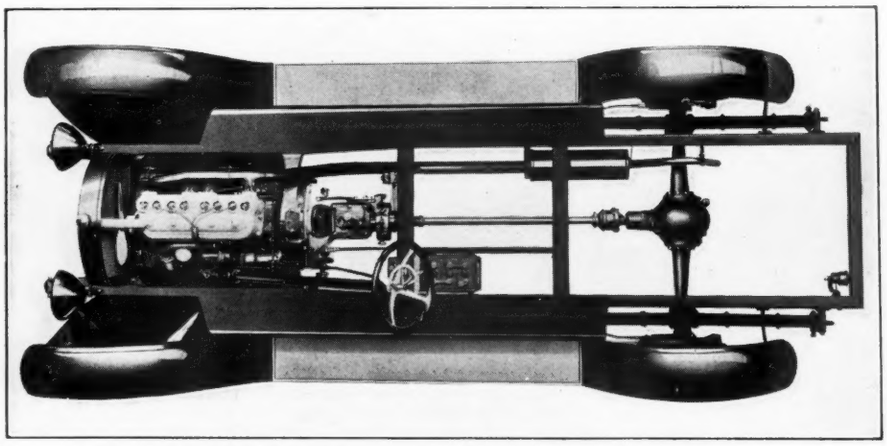


Jeffery Quad Detail
Drawing showing drawbar for use with trailers



Refined Jeffery Quad
Note the truss rod under frame, towing hooks and front bumper

hooks at both the front and rear of the frame. Where trailers are to be regularly used a special coil spring draft hook has been designed for the rear of the truck. In front a heavy bumper has been incorporated with the frame and this amply protects the radiator, which is spring mounted just ahead of the engine. The gear set cover has also been modified so that it follows more closely the outline of the mechanism and thereby reduces the amount of inactive grease in the gear box. The Duplex governor has been retained. This is set for a maximum of 14 m.p.h. when the truck is in fourth speed, which means an engine speed of about 1,200 r.p.m. When the truck is on one of the lower gears the governor throttle is controlled by the engine speed instead of the truck speed and this is set for a maximum of 1,500 r.p.m. Beside the four internal brakes, one at each wheel, there is a fifth of the contracting band type brake at the rear of the gear set. The hand lever applies all five brakes, while the pedal works only the four on the wheels.

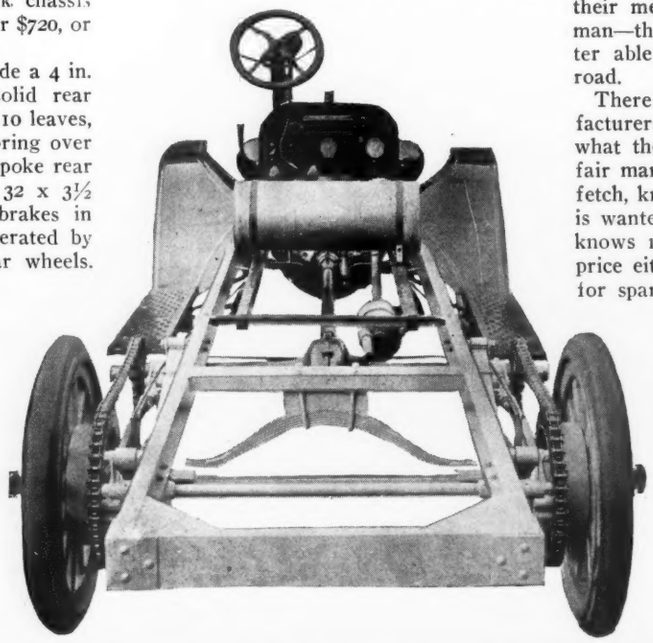


Chassis Layout of New Jeffery Rapid-Service Wagon
Note the very clean rear construction and emergency brake on drive shaft

UNION ONE-TON TRUCK ATTACHMENT FOR FORD CARS

The special features of this attachment are the extra heavy 2¼ x 1⅝ in. solid axle; large taper roller bearings, and vanadium steel castings. The attachment is made by the Union Truck Mfg. Co., 250 West 54th St., New York City. This company will supply either the truck chassis and Ford power plant complete for $720, or the truck parts alone for $350.

The truck parts furnished include a 4 in. channel rolled steel frame, a solid rear axle, semi-elliptic rear springs of 10 leaves, 42 in. x 2 in., and an auxiliary spring over rear axle; 32 in. artillery square spoke rear wheels; solid rubber tires, rear, 32 x 3½ in.; 2½ in. internal expanding brakes in 12 in. drums on rear wheels, operated by lever and Baldwin chains to rear wheels. by using the chain drive in combination with the regular Ford differential a 7 to 1 reduction is obtained. The makers state that the solid rear axle practically carries 75 per cent. of the load.



Showing How the Union One-Ton Truck Attachment is Combined With a Ford Power Plant

BRITISH COMMERCIAL CAR USERS DO EXTENSIVE CAR MAINTENANCE

By OUR FOREIGN CORRESPONDENT

There is at present a great tendency among the majority of business people who make any considerable use of the commercial car in Great Britain to do their own repairs and maintenance. More and more are users equipping their garages with tools and plant, and some of them have, or are arranging for, a very complete equipment. Thus in the slack time, when only cars can be spared, they are able to keep their men employed, even though cars are out of commission. Such an arrangement the users contend both enables them to keep their men, and leads to a better class of man—the man who is a mechanic, and better able to overcome any trouble on the road.

There is a lesson in this. British manufacturers have charged for spare parts, not what they were intrinsically worth with a fair margin of profit, but what they would fetch, knowing well that when a spare part is wanted, it is badly wanted, for necessity knows no law, and hardly knows any price either. It is the high prices charged for spare parts in the past, in conjunction with the very often unreasonable charges of repairers, which have led to this development. Nevertheless, though it has damaged a profitable source of trade for the commercial car manufacturers, it is, from their point of view, not altogether a bad thing, providing the correct manufacture of these spare parts can be assured, since everything which conduces to the continued maintenance of the cars in proper order is all to their interest.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

The Selden 1916 Models Have Worm and Internal-Gear Drives

By GEORGE W. GRUPP

THE 1916 models of the Selden Truck Sales Co., of Rochester, N. Y., are a one and two ton worm drive, a two ton internal gear drive, and a three and one-half ton worm drive—all of which have been designed to meet the particular needs of their customers.

The two ton worm drive is an identical reproduction of their 1915 model, except for a few minor changes. The only new features of the two-ton internal gear drive is that this model was formerly their two ton chain drive. Other than these, no changes have been made in their two ton models. One unique thing, however, is the fact that their two ton frames are interchangeable. The two remaining models are new members to the Selden family of trucks.

Engines

The engines in both models are four cylinder, vertical, four cycle and of the unit power plant type. The cylinders of the one ton are cast in block while those of the three and one-half ton are cast in pairs. The former are 30 h.p. and have a 3½ in. bore by a 5 in. stroke, while the latter are 45 h.p. and have a 4½ in. bore by a 5½ in. stroke. Both engines are controlled by sealed governors. All dimensions are machined within close limits. The valves are enclosed so as to insure quietness of engine and to keep out dirt.

Lubrication is maintained by two plunger pumps. One forces the oil to the forward end of the engine, giving a well proportion to the timing gears and front bearings. The overflow is drained to the crankcase and thence into troughs in which the connecting-rods dip. The other pump forces oil directly onto the rear bearings of the engine and the overflow is thence carried into the rear of the crankcase. Underneath the crankcase is a large oil reservoir.

The system of ignition on both models is furnished by a high tension magneto, set with a fixed spark, and driven at crankshaft speed.

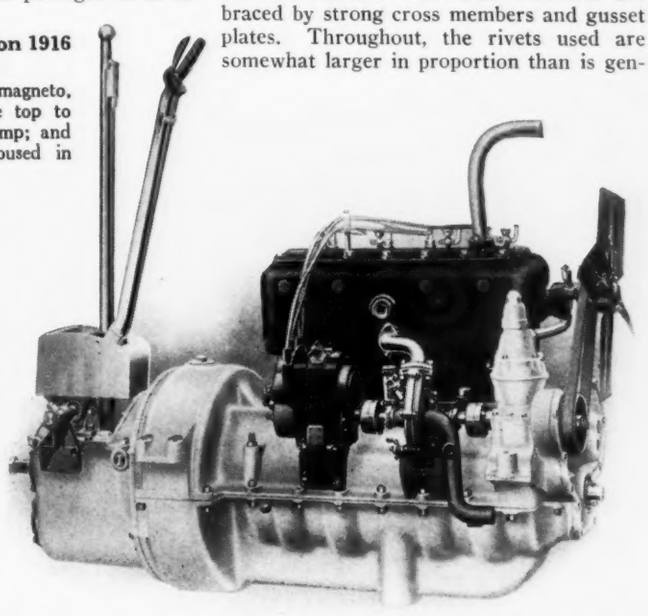
Cooling is accomplished by means of vertical tube radiators. Circulation is maintained by positive centrifugal pumps and belt-driven fans, mounted on the engines.

The governors, which are of the centrifugal type, and operated by shafts off the pump shaft, are so placed between the carburetors and engines that the drivers have absolutely no control over them.

Conventional designed carburetors are used. They have two gasoline nozzles and properly proportioned air passages so as to insure a uniform mixture at all speeds. Stoves fastened to the exhaust manifolds provide hot air which is conducted through flexible tubes to the air intakes.

A View of the Two-Ton 1916 Selden Engine

Showing high-tension magneto, four-bladed fan, removable top to water jacket, centrifugal pump; and clutch and transmission housed in unit with engine.



The Clutch and Transmission

All clutches, as used on both models, are of the well known multiple disc, dry plate type. They are integral with the transmission.

The transmissions on both models are of the selective sliding gear type. The gears and shafts being of ample proportion are made from heat-treated nickel steel. Taper roller bearings are used throughout. The one ton model has three speeds forward and one reverse, while the three and one-half ton has four speeds forward and one reverse, direct is on fourth.

The drive from the unit power plant to the rear axle is accomplished through two universal joints and tubular propeller-shafts. One of the joints is fastened to the transmission, which has a broached hole in which the propeller-shaft is free to move back and forth, while other joint is fastened rigidly to the rear axle. The propeller-shafts are made of mild chrome nickel steel. The diameter of the one ton tubular propeller-shaft is 2¼ in. in diameter, while the three and one-half ton is 3½ in.

Frames and Springs

All frames are made of pressed steel channel section. The side members are braced by strong cross members and gusset plates. Throughout, the rivets used are somewhat larger in proportion than is generally used. The one ton channel section is 4½ in. deep and has a bumper in the rear. The channel section in the three and one-quarter ton is 7 in. deep and of ¼ in. stock.

On both models the springs are so designed that they will take all of the torque and drive through them. The eyes are of bronze bushed and of unusually large diameters. The springs are made of special alloy spring steel and triple heated. The front springs on the one ton are 40 in. long

Top View of Selden 1916 Worm-Drive Two-Ton Truck

Showing unit power plant, four-cylinder block engine, left-side steering with center control, and well-braced frame

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

and 2½ in. wide, while the rear springs are 50 in. x 2½ in. On the three and one-half ton the front springs are 48 x 3 in., while the rear ones are 52 x 3½ in., and with double eyes. These double eyes are very advantageous because in the event of a breakage of the top leaf the second leaf will automatically assume the burden of the load and thus the driver is able to continue on his way without a halt.

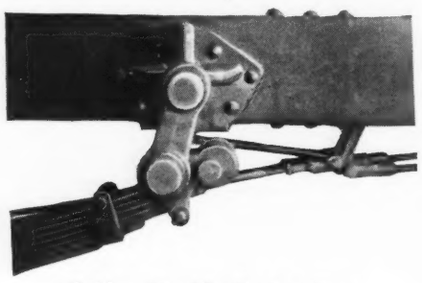
Brakes, Axles and Wheels

Each model is provided with two sets of brakes, a service and an emergency. Both brakes operate on the drums of the rear wheels.

The front axle on the one ton is made of 2⅝ x ¼ in. double heated carbon steel drop-forged I-beam section, while the steering knuckles and spindles are made of double heated 3½ per cent. nickel alloy steel. Roller bearings are used throughout. On the three and one-half ton the I-beam section is 3⅜ x 2¼ x ½ in. web.

The rear axles are Timken-Detroit worm drive of full floating construction type.

Solid tires are used throughout. The one ton is furnished with 34 x 3 in. fronts and 34 x 4 in. singles or 34 x 3 in. dual rears.



Selden Double Spring Eye

A view showing construction of the double eye in the three and a half ton Selden

The three and one-half ton is equipped with a 36 x 5 in. front and a 36 x 5 in. dual rear.

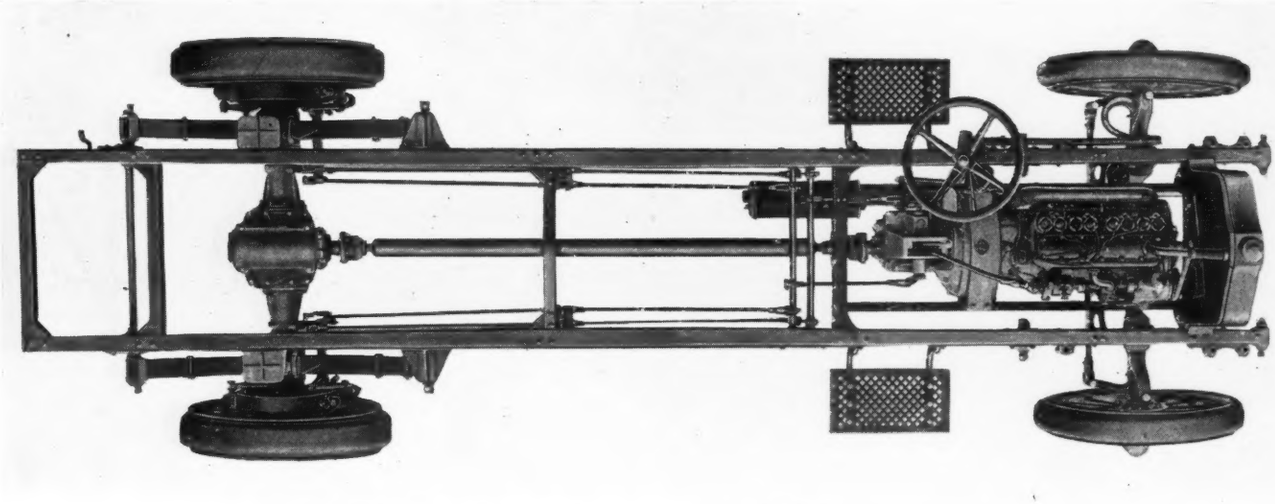
The tread of the ton, front, is 56 in.; rear 58 in; while the three and one-half ton tread, front is 61 in.; rear 66¾ in.

THE HOADLEY TWO-TON TRUCK, $3000

Hoadley Bros., Gosport, Ind., have placed on the market a 2-ton four wheel drive, four wheel steer truck known as the Hoadley. Our illustration of the underneath side of the chassis shows very clearly some of the novel features of construction.

Power Plant

The engine is a Milwaukee four-cylinder in block, 4⅛ in. bore and 5½ in. stroke. This engine is known as model F. The cooling water is circulated by centrifugal pump, engine three-point suspended. To the rear of the crankcase is securely bolted a bell-shaped aluminum casting which contains the multiple disc clutch and transmission gears. The clutch is made up of twenty-four small and twenty-five large steel rings bent at an angle of 20 deg. Transmission shafts and gears are of chrome vanadium steel, hardened and ground. Transmission bearings are of the ball type. The transmission provides four speeds forward and one reverse. Ignition for the engine is furnished by a Remy magneto and the carburetor is a Schebler.



Top-Side View of the Selden Three and a Half Ton 1916 Model

Showing Timken-Detroit Worm-Drive Axle, ribbed radius rods well-braced frame and steering post supported by V-frame from dash

The worms and the drive shafts are made of double heated chrome nickel steel. The drive shafts are so arranged that they may be removed without disturbing any other part of the axle.

The steering gears are of the worm and nut type, right hand drive. The one ton has 16 in. wheel, while the three and one-half ton has an 18 in. wheel. The control levers are centrally located. The maximum speed allowed by the governor on the one ton is 17 m.p.h., while on the three and one-half ton it is 13 m.p.h.

The height of the frame from the ground when loaded on the one ton in 30 in., three and one-half ton 35 in. The loading space back of the driver's seat on the one ton is 7 ft. 4½ in.; three and one-half ton, 12 ft. 1½ in.

The artillery type of wheels with square spokes are used throughout. They are made of a fine grade of hickory. The one ton has twelve 1¾ in. spokes in the front and twelve 2 in. spokes in the rear. S.A.E. rims are furnished as standard, thus allowing detachable tire rims to be used. The 3½ ton has twelve 2½ in. spokes in the front, while in the rear it has fourteen 3 in. spokes.

The wheelbase on the ton truck is 126½ in. while on the other it is 164 in.

The ton truck, which weighs 3740 lbs. and is equipped with three oil lamps, a horn, a jack, a set of tools and a driver's seat, sells for $1700, while the three and one-half ton, which is similarly equipped and weighs 6330 lbs., sells for $2950.

Hoadley Two-Ton Truck, $3000

Four-wheel drive and steer; Milwaukee four-cylinder engine; final chain drive to each of the four wheels

Standard Parts

The Hoadley truck uses a number of well known standard parts in its construction, including Blood Bros. universal joints, Liggett springs and axles, wheels by Standard Wheel Co., jackshafts by Lefever

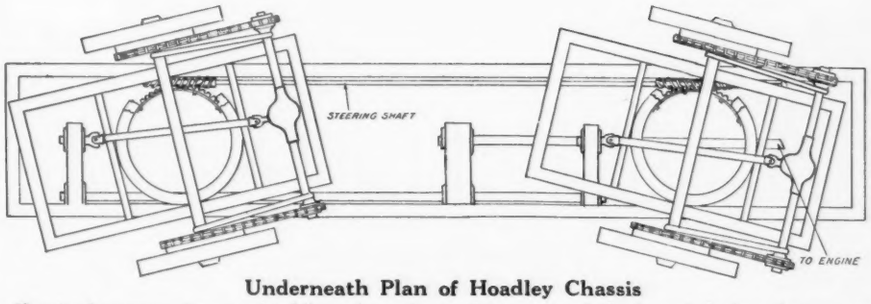
Arms Co., Hyatt roller bearings, special gears by Foote Bros. Gear and Machine Co., sprockets and chains by the Diamond Chain Co.

Other Details

Special attention is called to the fact that both ends of the truck are exactly alike in construction insofar as the four wheel drive is concerned. The fifth wheels run on ball bearings. The steering is controlled by a right and left worm, making a positive and easy control. Two differentials are shown on the jackshafts and there is a third in the gear box in the center of the frame to take care of the difference of travel between the front and rear trucks going over hilly roads or uneven surfaces.

There are eight hub brakes, four internal and four external. Driving stresses are taken through radius rods, torque being taken through radius rods and springs.

Tires are solid, 36 x 4 in. front and rear, wheels being of wood. Wheelbase is 145 in., springs semi-elliptic front and rear. Steering is from the left, with central control. The price complete is $3000.



Underneath Plan of Hoadley Chassis

Showing how power is transmitted from the engine to the two sets of wheels, and also how the two sets of wheels are steered simultaneously by means of worm gearing

How a Buffalo Dealer Won Success

By GEORGE W. GRUPP

"A little over seven years ago I was in the baking business," began L. G. Schoepflin, president of the L. G. Schoepflin Co., Western New York agents for the Republic, Adams and Standard motor trucks, "and to-day I am in the motor truck business."

When asked how he came to make the change, he replied: "As my delivery wagons had become a problem, I was obliged to solve this difficulty or eventually go to the wall. So I began to look around for a remedy. And among the many things which I considered was the motor truck. At once I became interested and believed that the motor truck had a great future. In fact, I became so enthusiastic over the idea that it was but a short time thereafter that I sold out my baking interests so that I might enter the truck business.

"This is how I started. After securing the agency for the Rapid in 1909, another gentleman and I each put up $5000. With this sum we bought our first truck and rented space. It was a slow grind that first year, so much so that my partner became discouraged and sold his interests to me. But despite this slow progress I still maintained that I must succeed because the truck had a future.

"The next year I took over the agency for the Adams and, to my surprise, that year, all alone, I just doubled the sales, and they have been on the increase ever since. In 1911 I added the Menominee, which I dropped in 1914, and in 1913 I took over the agency for the Republic and in 1914 the Standard agency."

His Most Difficult Sale

His most difficult sale he relates in the following manner: "Some time ago I was soliciting a miller out in Clarence, N. Y., and as I entered his place of business one morning I found quite a number of men in the office. At once I saw it would be impossible to do anything in an office full of men, so I asked him if I could see him alone for a few minutes. To this he consented, and then led the way to the engine room.

"I immediately pulled out a contract upon reaching the engine room and began reading it to him. When I got through he told me that he did not want a truck. Then I asked him when he thought he would consider buying one, to which he replied, that if he wanted one he would buy it now.

"When he said that I started to ask him questions and began filling out the contract. When I got through I asked him to sign it. He refused, so I tore up the contract.

"Then I began all over again, asking him the same questions and filling in the answers in the contract, and when it was completed I again asked him to sign it and again he refused, so I tore up the second contract.

"Did I stop there? I should say not. I began to fill out the third contract, and while doing so I asked him to call in his son. He did so. And then I went over the same ground with the son in his presence, and winding up with something like this: 'If you don't get a truck now, the other millers in town will get ahead of you by employing a truck and thus demonstrate to their customers and to yours that they are more efficient than you are.' That drove the truth home, and with the assurance from his son that it was a wise step, he signed the contract and made a $50 deposit. And to-day that man is the happiest man you ever saw because he owns a truck. In fact, he is so pleased that I sold him that truck that he surprised me one day by presenting to me ten gallons of cider."

Another Sample of His Sales Method

Another sample of this dealer's persistence is seen in another account, which he gives in this wise: "It was while I was still selling the Rapid that I saw a competitor of mine talking to a carting man on the street. I followed them as they drove along in the old wagon. Presently the salesman left him, and then I seized the opportunity. I ran after this cartman and asked him for a ride. It was agreeable to him, so I jumped onto the seat beside him. And as we rode along I gradually led the conversation up to the point where I said that he ought to use a motor truck. This interested him, so I persuaded him to come over to my garage at once, as he was driving in that direction. He did, and he made a close inspection of everything. Then I finally asked him to be my guest on a trip to the Detroit factory, which he accepted.

"On the trip up the lake, as we went by boat, I never mentioned a word about motor trucks, but instead I talked about everything else, and particularly about personal affairs, with the result that by the time we reached Detroit I knew a good bit about his personal history. This proved to be the clincher when I closed the contract that afternoon in Detroit."

Competition

"Now, in competition I usually let the other fellow do the educating and I do the closing. Here's a sample: I was once competing against eight agents. The prospect had agreed to give each salesman thirty minutes in which to present his case. Four had preceded me, and as I entered his office he greeted me with the wave of a hand and said: 'I can only give you fifteen minues, as I have been talking trucks for the last two hours and I am just filled up to the collar.'

"To all of this I said that fifteen minutes was all I needed, as I did not come in to talk trucks but to talk service. That made a profound impression and resulted in my getting his signature on a contract within ten minutes.

"Business men," continued Mr. Schoepflin, "haven't time to go into the question of mechanism. What they want to know is whether you give service and the kind of service. If your truck is a well-known make, he takes it for granted that your truck is mechanically O. K.

"Don't you ever go into the question of cost with the prospect? he was then asked.

"I used to do that, but I don't any more. The prospect knows what it will cost him in round figures. It is only a question of can he afford it or not."

The CCJ has most advertisers because it gives them biggest returns

The George Automatic Roller Bearing

The George Automatic Roller Bearing Co., of Cincinnati, Ohio, is now offering to the trade the George Automatic Bearing, which combines balls and rollers in a manner that automatically compensates for variations in roller diameter. It may be described briefly as a roller bearing in which the rollers are held in suspension on balls and combines the functions of a radial and thrust bearing.

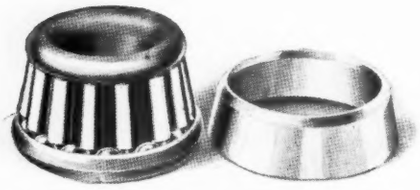


Fig. 1. General Construction of the George Automatic Bearing

A general view of the bearing, which will bring out the fundamental principles of its construction, is shown in Fig. 1. The balls, which are placed in the bearing in two rows as indicated, not only decrease the frictional resistance of the bearing, but permit of the automatic adjustment of the rollers. Furthermore the construction is such that concentricity of the bearing itself, as well as of the bearing upon its mounting and its housing, is secured without compelling expensively close limits in machining. An ingenious method of mounting and dismounting the bearing has been provided for and the bearing itself can be taken apart for inspection, cleaning, etc., without the use of any tools or the springing or distortion of any of its parts.

Briefly, the bearing is conical, the rollers being tapered to compensate for the conical race and having a lateral freedom controlled by the contact of the balls at "A" (Fig. 2) on the conical ends of the rolls "B." When the bearings are mounted and tightened in place, there is a wedging action on the rollers, but as soon as the bearing has made a half turn, the large rollers tend to creep toward the large end of the bearing owing to the pressure upon them, thus forcing the balls in contact further apart. The small rollers are thereby forced toward the smaller end of the bearing until, when all the balls and rollers have assumed their running positions, the working diameter of all the rollers at any section of the cup and cone is exactly equal. The action of the rollers in moving laterally to compensate for inequalities in diameter, is shown in Fig. 2, the view on the left showing the diameters of the rollers at section C-D. before adjustment has taken place, and that on the right the section on the same line after the automatic adjustment.

In this bearing the balls at the inner and outer ends of the rollers are used as separators. This design provides rolling contact between the balls and rollers, thus eliminating the frictional resistance, which would come from a sliding action. Also, the conical ends of the rollers acting in conjunction with the balls form a true concentric action and overcome any tendency to skew out of the true rolling axis.

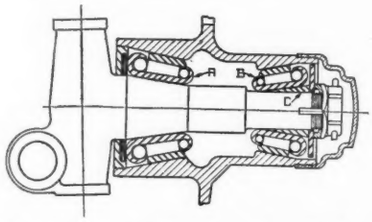


Fig. 4. George Bearing Mounted on Front of Axle Spindle

Referring to the view at the left of Fig. 3, if there is P pounds end thrust on each roller, there will be a reaction between the two balls along the normal lines B and C. Owing to the shape of the end of the roller, the angle made by P B must be the same as the angle made by P C, consequently the forces B and C are of the same magnitude and the axis of rotation remains true. For a roller to depart from the true axis of rotation by even a theoretically small angle, the balance of the forces mentioned above would have to be upset as in the view at the right of Fig. 3. In the presence of this condition the distance between the centers of the two balls would be increased, which means that the balls would be separated in the bearing. This condition is impossible, because the circle of balls and rollers is completely filled and in order for two balls to separate, some ball or roller would have to be compressed. Since the compressive strength of the material will always be greater than the force tending to skew the rollers out of line, the rollers remain on their true axes.

One of the claims for the bearing is that in mounting great accuracy in machining is unnecessary. Both the inside and outside surfaces of the bearing are tapered and hence concentricity is obtained by tightening the bearing in position. At the same time a variation in diameter of the housing or seat in mounting is taken up by a very slight lateral movement of the whole bearing. Fig. 4 shows a typical installation of a front hub fitted for George automatic roller bearings. As will be noted, the tapered surfaces render unimportant close limits in machining for the bearing mounting. In the typical George mounting shown, the bearing A does not touch any part of the spindle until it rests on its tapered seat. The hub is then mounted by moving it laterally until it rests upon its tapered seat and bearing B is then put in position and it in turn must come to rest on its tapered seat, after which the split tapered collar C is slipped over the spindle, and that again must rest on its tapered seat. The splined washer, lock adjusting nut and cotter pin are then put into position in the usual manner. The entire assembly is then concentric with the axis of rotation of the wheel and this has been accomplished without the use of special tools or any force. The company also furnishes bearings that will interchange with other long series types of roller bearings.

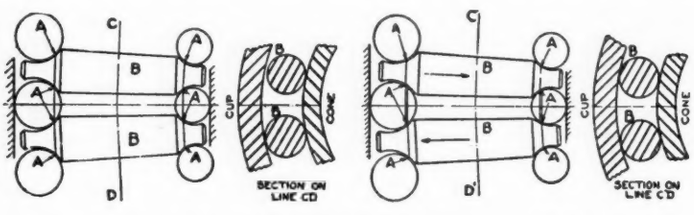


Fig. 2. Illustrating the Self-Aligning Features of the George Automatic Bearing

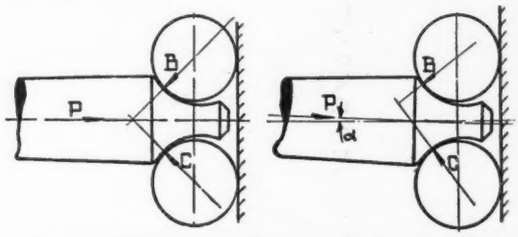
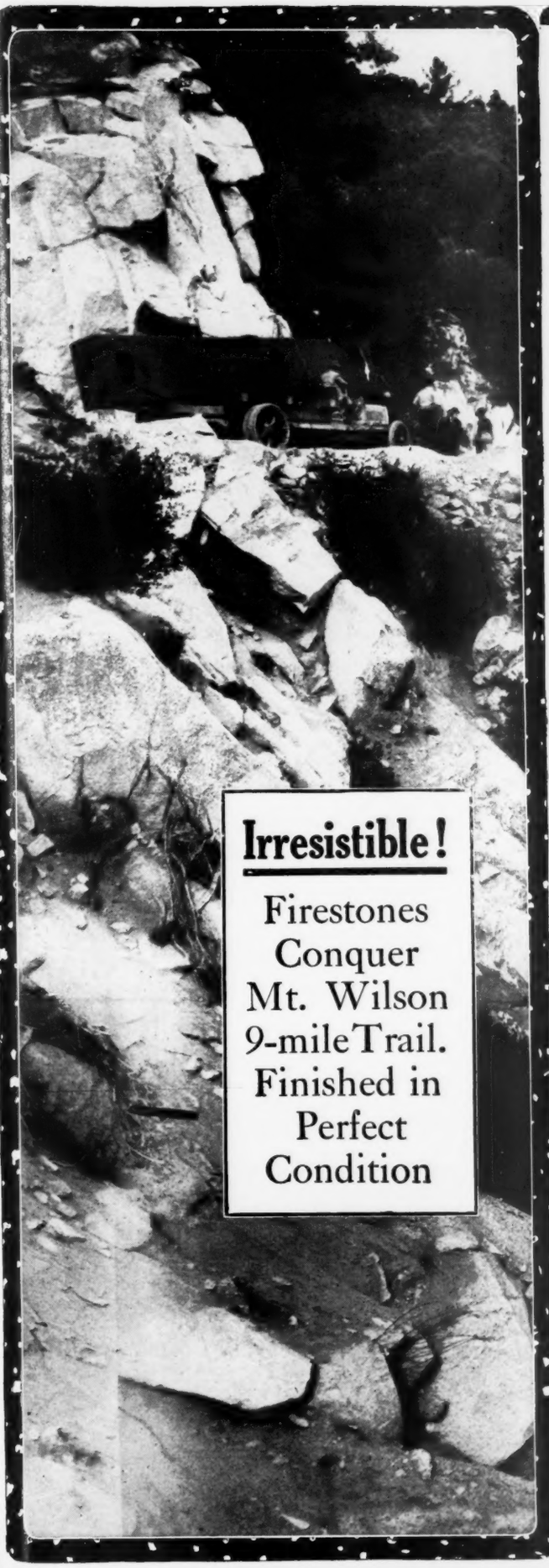


Fig. 3. Illustrating How the Rollers are Kept on Their True Axis

The CCJ leads in circulation, advertising and prestige



Irresistible!

Firestones Conquer Mt. Wilson 9-mile Trail. Finished in Perfect Condition

Firestone

Truck Tires At the Top!

WHEN experts needed material for the world's biggest telescope on Mt. Wilson, California, Firestone was the tire equipment that proved equal to the task of tackling the mountain trail. Going to the top is easy for Firestone.

The conditions were extraordinary. Grade nineteen per cent much of the way; rocky road, narrow and tortuous; and a load of sixteen and one-half tons, which rested—a dead weight—frequently only on rear wheels. Equipment was 37 x 5 on front—43 x 6 duals on rear—Firestone Hard Base Removable tires. Write for further data on this trip. It will go down in tire history as a thrilling event.

Such extreme and drastic tests prove the in-built quality which has made Firestone Truck Tire equipment the choice with leading manufacturers of every kind of vehicle, everywhere.

Tires for Trailers

Every type—heavy and light—brought to highest degree of perfection. See the Firestone service man.

Firestone Tire and Rubber Co.

"America's Largest Exclusive Tire and Rim Makers"

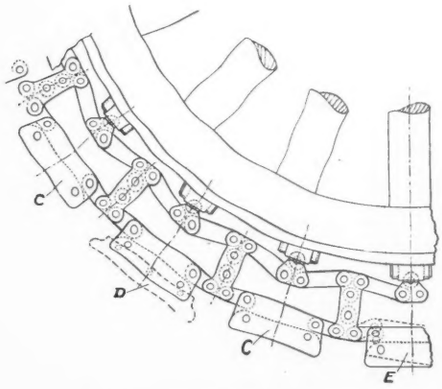
Akron, Ohio—Branches and Dealers Everywhere

NEW FAVARY HEAVY TRUCK TIRE MADE ENTIRELY OF STEEL

This tire follows closely in principle of design the Favary tire placed on the market some time ago, and which consisted of a cloth tread supported by blocks of aluminum. In the new tire flexibility is obtained by a system of linkage, whereby a wide band of links is flexibly supported by blocks which are spaced equally around the periphery of the wheel felloe. One of the illustrations shows a tire that is being used

The Favary Tire With Side Flange Removed

on a 'bus. A side flange has been removed to show the construction. The carrying capacity of the tire is three tons for each tire. For heavier loads the tire is made dual, and for smaller loads it is constructed narrower, or made of smaller links. All the links have hardened steel bushings and are used with hardened studs. The whole construction is treated by the Coslett proc-



Section of the Favary Tire

The tread is made of blocks. C. If desired, the area of the surface can be increased, as shown at D, or D may simply be a receptacle for rubber blocks, or blocks of rawhide. For country roads and general field work, the steel block tread, without any attachments, is recommended.

ess to make the tire permanently rustproof. When new, the whole tire is immersed in a graphite compound, which enters all the joints. Thereafter the tire needs no attention for about 10,000 miles, as the motion of the links is very slight.

The durability of these tires is figured to be approximately 25,000 miles. No spares or repairs of any kind are required. Where rubber or rawhide blocks are provided, they can be renewed when worn out. The tensile strength at the weakest point is claimed to be about 150,000 lbs. The tire and rim are applied to standard wheels.

The makers claim that no mud or dirt will become lodged in the apertures of the tire—if placed in by hand, the action of the tire and centrifugal force throws all foreign substance out.

"GASOLETTE" FOR INCREASING ENGINE POWER

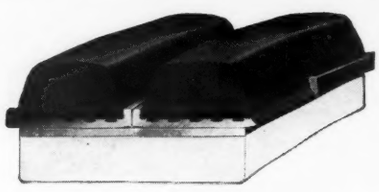
Under the trade name of "Gasolette" the Motor Necessity Co., of Gasolette Building, Chicago, is manufacturing a liquid compound which is mixed with gasoline and claimed to increase the engine power about 40 per cent. and keep the engine free of carbon. It will mix with gasoline without stirring, and is guaranteed not to contain picric acid, ether, or any ingredient injurious to engines. A quart can sells for $1.35 and is sufficient to treat 64 gals. of gasoline. It costs $5 per gal. This material is distributed in New York City by the Protex Co., 1790 Broadway.

New Buckeye Truck Jack No. 16

The feature of this jack is, that by means of gearing, the leverage is compounded, so that the load can be lifted with about one-third the energy required when direct leverage is employed. Its capacity is five tons and it weighs 28 lbs. This jack is built by the Buckeye Jack Manufacturing Company, Alliance, Ohio, and lists at $18.

McGRAW TRUCK TIRE

The new McGraw tire, made by the McGraw Tire and Rubber Co., of East Palestine, Ohio, has many characteristics that commend it for heavy truck service. The tread is exceedingly resistent, yet is of such a profile that chafing is impossible. The wearing surface of the tire is broad, consequently every available inch of tread rubber is utilized in buoying up the load and in minimizing lateral vibration. A feature of the tire is the elimination of all unnecessary fastenings and weight. The regular high profile European type tire will be continued in addition to the new line of equipment.

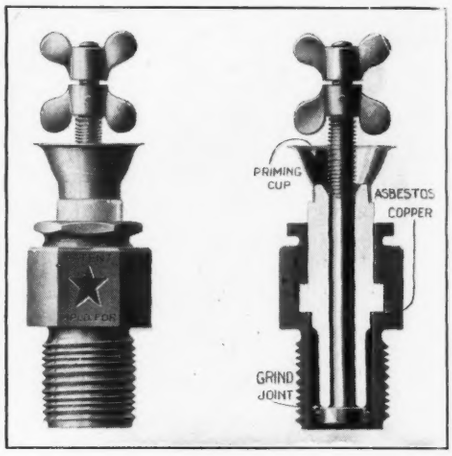


The New McGraw Truck Tire

This new tire was announced in our last issue. It completes the McGraw line of truck tires for heavy duty.

NEW PRIMING SPARK PLUG

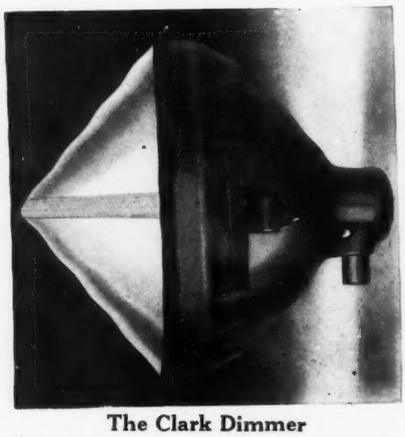
The Star Specialty Co., of York, Pa., offers the Star Booster Priming Spark Plug, price $1.25, polished and nickled at $1.50. The body is soft steel, priming cup and wing nut of brass. The center electrode is drawn down with the entrance of each charge of gas into the cylinder. Thus the priming gasoline is drawn in at the place which makes starting easy. In ordinary running warm air is drawn in, which is claimed to improve the mixture, increase



Star Priming Spark Plug

This illustration shows the Star plug entire and sectional view. Note priming cup to assist starting of engine.

the power, and keep sparking points cool. Plug can be cleaned without removal by loosening packing nut and lifting out the porcelain. Made in 7/8-18 in. (S.A.E.) and 1/2 in. sizes.



The Clark Dimmer

A very simple covering that fits snugly over the outside rim of the headlight. Gives a perfect driving light without the glare. It is made of Pyralin and has a seam through the center which permits of it being collapsed. Price is $2.50 per pair for headlights up to 9 1/2 in. in dia. and $2.75 per pair for larger headlights. Made by the Cherry-Clark Guard & Dimmer Company 115 South Dearborn Street, Chicago.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

344 MOTOR WORLD

A Line of Motor Trucks to depend on
A new Sales Plan to make money on
The United Line of Motor Trucks

2—2½—3—3½—5—6-Ton Trucks—All Worm Drive

Whatever you may have experienced in selling Motor Trucks before, you have never known or been offered a selling proposition such as ours. It requires no investment on your part, and permits you to make sales to prospects you know exist but have been unable to approach because of stringent factory restrictions.

You may not know United Motor Trucks through having seen them perform. You do know intimately the service the units in the specifications given here have rendered.

(SPECIFICATIONS)

These specifications represent satisfaction in a United Motor Truck. That is the known quantity. The unknown quantity is the Selling Plan and you cannot afford not to know what it is any longer. Write or wire us for the particulars

THE UNITED MOTOR TRUCK COMPANY
671 North Street, N. W.
GRAND RAPIDS MICHIGAN

CONTINUED RECOGNITION

"You do know intimately the service the units in the specifications given here have rendered."

Again we call to your attention that the leading American truck manufacturers equip their product with Pierce Governors and announce that fact as an additional reason for deserved patronage.

Here is another combination of the leaders of the commercial vehicle industry:—

Wisconsin, Eisemann, Gemmer, Mayo, Pierce, Brown-Lipe, Sheldon, Stromberg

In every combination of leaders you will find the name of

PIERCE

The World's Premier Governor built by the largest governor builders in the world.

We will gladly tell you why Pierce Governors help sell your product.

Pierce Governor Company
Anderson, Indiana

THE G. B. S. ENGINE FOR TRUCKS

The Golden, Belknap & Swartz Co., 1248-60 Grand River Ave., Detroit, Mich., is offering its model EM-31 engine as a job designed strictly for truck service.

The engine is rated at 36.9 h.p. at 2800 r.p.m. brake test. The bore is 3¾ in., stroke 4¼ in. Among the special features may be mentioned a detachable cylinder-head, extra large bearings and unit power plant construction.

The valves have cast iron heads fused onto ⅜ in. carbon steel stems; stems and valve seat are ground on centers. Valve stem guide is bushed with cast iron sleeve, 3 3-16 in. long. Valve lift is 7-32 in.; clear opening, 1 5-8 in., outside diameter, 1 13-16 in. All valves are adjustable and enclosed with breather plate covering valve chamber and this cover plate has three breather openings which allows crankcase compression to pass out of crankcase into valve chamber and through these breathers in cover. Breathers are so arranged that no oil can pass but gives free air circulation.

The oiling system is by combination force feed and splash. The force feed plunger pump, operated from No. 4 exhaust cam, on camshaft, forces oil from stamped steel oil tank to revolving sight feed on dash. This sight feed is provided with oil line leading the oil back to the three main bearings of engine and then runs into the stamped steel oil tray, where the scoops on lower end of connecting-rods dip up oil, assuring a generous supply of oil at all times. This oil tray is provided with oil level openings and when oil reaches this level, it runs back by gravity into the main oil tank, where it is filtered through a fine mesh screen when again pumped to sight feed on dash.

Connecting-rods are made of 30 to 36 point carbon steel, drop forged and heat treated. Crankshafts are made of 35 to 45 carbon steel, are drop forged and heat treated.

This engine is fitted with a single steel drive plate clutch, having two asbestos wire woven friction discs which are practically the only parts requiring renewal. The clutch runs in a bath of oil, and is self-adjusting.

The engine is so arranged that the starter may be left off and should the customer afterwards decide that he wanted to install one of the electric lighting and starting equipments adaptable to this engine, it could readily be done by simply removing the cover plate on the crankcase and putting instead the bracket to hold the generator.

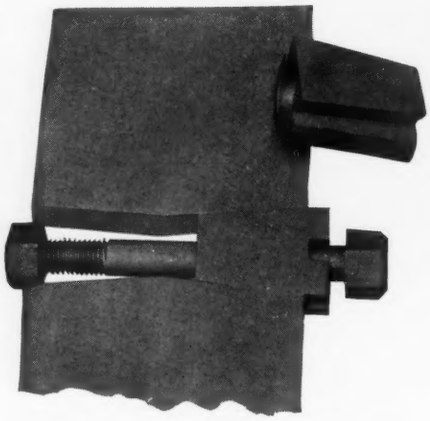
"ULTRA-BLACK" RUBBING VARNISH

The Atlantic Varnish Works, of Richmond, Va., is manufacturing a new rubbing varnish that should prove of interest to the commercial car and body builder. The makers claim that their product is the blackest rubbing varnish known and it gives excellent wearing qualities, as well as handsome appearance.

FRENCH & HECHT STEEL WHEEL

The illustrations show the steel wheel which is made by French & Hecht, of Davenport, Ia., and Springfield, Ohio. This wheel is made in various sizes and can be used with any of the demountable rims now on the market.

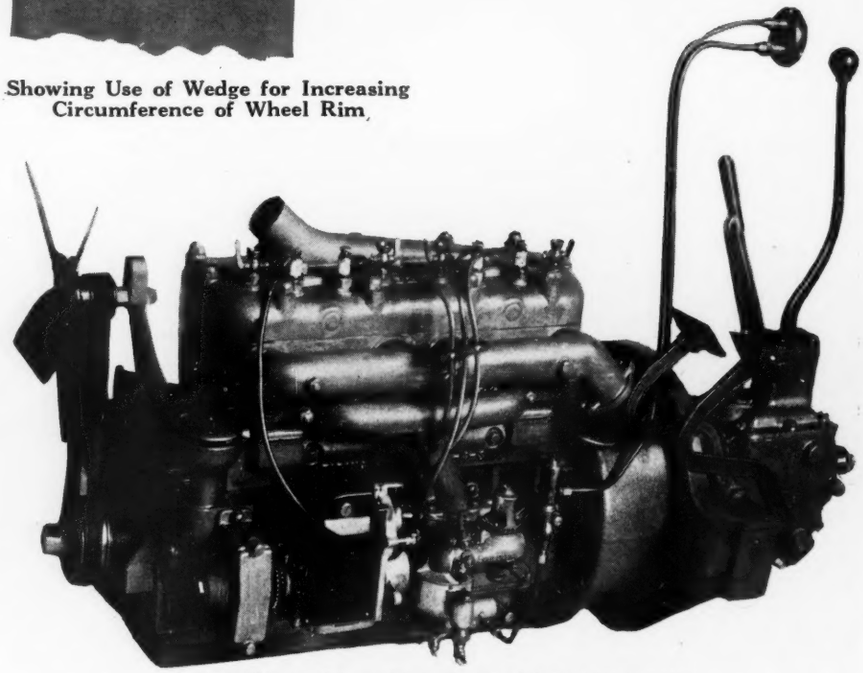
French & Hecht Steel Truck Wheel
Rear-axle type. Note manner of mounting brake drum



Showing Use of Wedge for Increasing Circumference of Wheel Rim

One of the notable features of this wheel is that it can be readily fitted to any "pressed on" type of tire. No presses are required, it being simply a matter of drawing up the wedges. The wedges expand the rim of the wheel within the tire rim. In trials made with these wheels, the makers report that there has not been the least movement or slipping either as the result of drive or side thrust. The wheels are built of solid steel members, the arrangement and distribution of the metal being such as to give maximum results as to strength and durability. The spokes are solid and are shouldered into both the hub and rim.

French & Hecht Steel Truck Wheel
Front-axle type



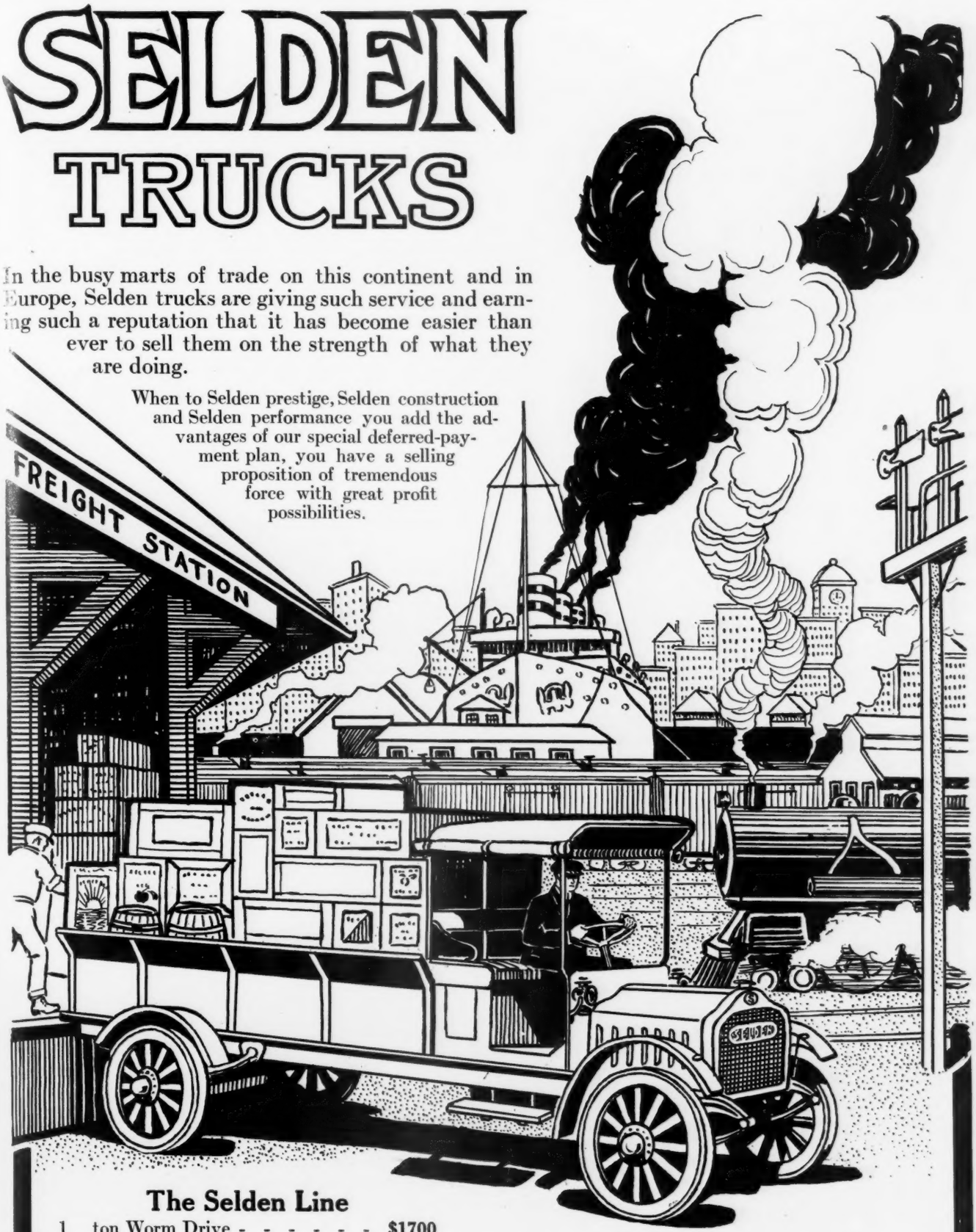
Left Side of the G. B. & S. Model EM-31 Engine
This engine will take several of the standard makes of transmissions and standard double-unit electric lighting and starting equipments

The CCJ is the only truck publication a member of the Audit Bureau of Circulations. There's a reason!

SELDEN TRUCKS

In the busy marts of trade on this continent and in Europe, Selden trucks are giving such service and earning such a reputation that it has become easier than ever to sell them on the strength of what they are doing.

When to Selden prestige, Selden construction and Selden performance you add the advantages of our special deferred-payment plan, you have a selling proposition of tremendous force with great profit possibilities.



The Selden Line

1	ton Worm Drive - - - - - - -	$1700
2	" Worm Drive - - - - - - -	2250
2	" Internal Gear Drive - - -	2000
3½	" Worm Drive - - - - - - -	2950

Write for our sales plan—it may mean much to you

Selden Truck Sales Company, Rochester, New York

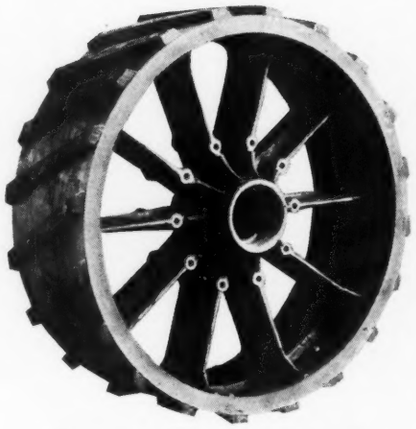
West Ten-Ton Trailer Wheel
Weighs 900 lbs. It is 48 in. in diameter and 10 in. across the felloe

WEST'S HEAVY-DUTY CAST-STEEL TRUCK WHEELS

Two of the latest types of cast steel truck wheels made by the West Steel Casting Co., of Cleveland, Ohio, are illustrated herewith.

The cleated wheel is especially designed for use on tractors, war vehicles, or where soft roads are to be traversed. The wheel illustrated shows the first one out of the foundry and has riveted-on cleats. Since then, however, all cleats are put on with flush head bolts, so that they can be removed if desired. The cleats are drilled to templets so that they all fit exactly in place.

The trailer wheel is made with Y-spokes, webbed on each side and brushed with a phosphor bronze sleeve, 14 in. in length and 4 in. in diameter. This wheel is designed for use on 10-ton two-wheel trailers, used in connection with a short wheel-based tractor.



West Ten-Ton Tractor Wheel
This wheel is also termed a "rough roads wheel". It is 42 in. in diameter by 15 in. across felloe. Weight 900 lbs.

A Talk With Washington Truck Dealers

By LEE L. ROBINSON

JOSEPH TREW, of Trew & Trew, representatives in Washington and nearby territory of the new Reo truck, believes that the outlook for the commercial car business in this locality is good, but not necessarily what it might be in a territory which is distinctly commercial in character. Trew & Trew have recently taken over the truck business here, and Mr. Trew, in discussing his observations made up to date, was careful to say that he had not gone into the truck end sufficiently to justify extensive observations touching the past, present and future of commercial cars.

His idea is that a reasonable territory, one which can be properly handled, is important in that it gives one an opportunity to extend his activities, instead of confining them to a small and restricted territory. He believes a new territory should be developed carefully and that good business may be worked up in territory which ordinarily would not be counted as A1.

Sees Big Future for Small Trucks

Mr. Trew believes a fine future is at hand for the small delivery wagon and 2-ton truck. As to the former, he thinks, many business men of comparatively small lines are pretty certain to have their attention drawn sooner or later to possibilities growing out of motor service. Mr. Trew is one who thinks that the utility of the motor truck, van or small delivery wagon is bound to appeal to business men not only from a standpoint of utility, but from other standpoints. As he sees it, the question of economy, the possibility of saving money by supplanting horse-drawn vehicles, is not always a good or necessary argument.

In fact, Mr. Trew says, that motor trucks may cost more than horse-drawn vehicles in performing a certain service need not deter salesmen in the least from talking the motor article. His idea is that even at some slight additional cost a merchant or manufacturer would in the long run be justified in using motor service for the satisfaction afforded in transporting his goods, the advertisement he gets from such motor service, the ability to more quickly serve his trade and other potent inducements.

Therefore, according to Mr. Trew, the salesman to-day must talk the horse cost of delivery in seeking to sell a commercial motor car, but he should talk frankly on this subject, admitting that, in some instances, it might be a little cheaper, figuring only the monetary outlay alone, to continue the horse-drawn vehicle. But, he thinks, the other arguments possible to offset this one are so numerous that where this condition does arise occasionally it could be effectively met with suggestions as to increased prestige growing out of motor service, the satisfaction afforded both merchant or manufacturer, and their customers, and the growing tendency on the part of enterprising business men to use commercial cars.

Mr. Trew suggested that a coal dealer, for instance, one who has occasion to have large quantities of such a product handled, might easily figure a big advantage in the long run, even should it not be as economical at first.

Touching service and the need of it, Mr. Trew was in no doubt. He has been a firm believer in service in the pleasure car line, he said, and his faith in it has been justified. He, therefore, is proceeding to give especial attention to the service end in the handling of commercial cars. He has found that the right kind of service is one of the principal aids to a successful motor car business.

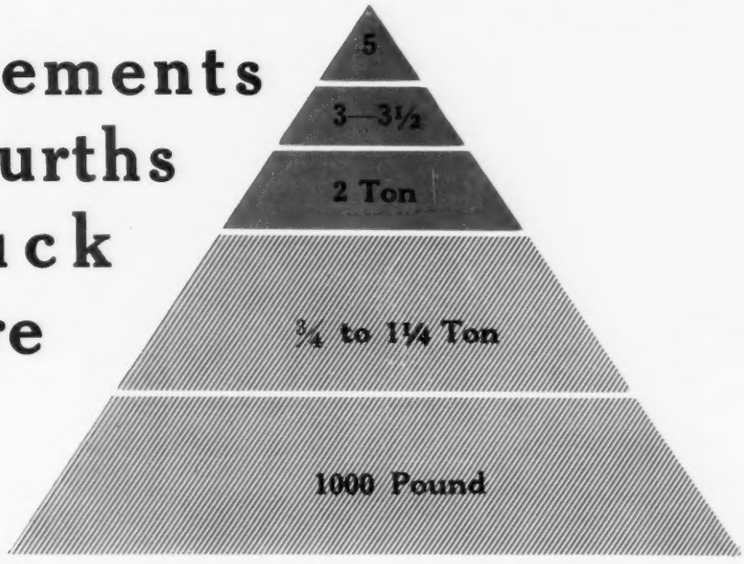
The way to meet competition is to meet it, Mr. Trew thinks, and he believes commercial car salesmen should be so well equipped with reliable information touching their offering as to be able to answer questions not only as to the character, equipment, etc., of their car, but of other cars offered in competition.

A Strong Believer in Service

Mr. Rowe, of the Henderson-Rowe Co., agents for the KisselKar trucks in Washington and vicinity, wants to be put down as a strong believer in service. He thinks that a dealer should place service at the very top in calculations looking to the keeping of commercial car patronage, and it should be emphasized in seeking to secure new business. His idea is that service counts big, so big that it cannot successfully be ignored. He thinks Washington offers opportunities for extending the commercial car business, but not to as great an extent, naturally, as a manufacturing town would. For a line of truck models such as the KisselKar Co. is offering through his firm, Mr. Rowe believes, Washington will prove a fairly good consumer, but he is of the opinion that Virginia and surrounding territory will prove even better than Washington, in proportion to the commercial population covered, as Virginia business men are awaking to the advantages of the motor car in business life.

The line being sold by the Henderson-Rowe Auto Co. includes truck models with a carrying capacity of from 1,000 to 12,000 lbs., a range sufficiently big, Mr. Rowe believes, to cover the needs of his territory. Mr. Rowe, like most of the commercial car dealers of Washington, is inclined to

The requirements of three-fourths of all truck prospects are covered by the line of



Stewart Delivery Trucks

Think what that means to you, as a dealer—and to your profit account. It means a line that has no stickers, a line that's easily sold, a line that doesn't tie up your capital, a line that earns big profits, because its models are the size, price and type that buyers want.

At least 75%—probably considerably more—of all delivery and hauling problems can best be solved by trucks of from ½ to 1¼ tons capacities—and that is the range of the Stewart line.

Why tie up your money in a large capacity, heavy-duty line, where prospects are few, competition severe, sales hard to make, and repeat orders a rarity? How much better to take on the Stewart line when your field of prospects is almost unlimited and your opportunities for profit great.

The Stewart line comprises three models—a 1000 pound delivery car, a ¾ ton model and our popular 1¼ ton truck. Here's a truck over which you can enthuse! It's a high-class job in every respect and it's made an unbeatable record in every city where it has been introduced. With it, an energetic dealer can clean up the ton truck field, for he can offer 500 pounds greater capacity for less money than is asked for most of the one-ton trucks!

This model is used with remarkable success and economy by large and small concerns in almost every line of business in the country, and has earned the reputation of being one of the greatest repeat-order producers in the entire field. It has been a veritable gold mine for Stewart dealers.

Back up this truck with the other two models and you can do a business that's vast in its scope, and a remarkable producer of profits.

Quality Trucks at Quantity Prices

Write us for Particulars of Our New Sales Plan

Stewart Motor Corporation, Buffalo, N. Y.

think that the time has not yet come when a salesman can ignore the horse-drawn vehicle, basing his chances for sales on the acknowledged superiority of the motor car. A good-sized territory, Mr. Rowe thinks, acts as an incentive to keep a representative on the job all the time, and keeps him keyed up to the possibilities which always lie in the future.

The Henderson-Rowe Auto Co. got into the truck business recently as a result of taking over the KisselKar line of pleasure cars. In a sense, therefore, they are new in the commercial car line. Mr. Rowe is inclined to the view that ingenuity will get results in the commercial car field equally with the pleasure car field, and that suggestions to a business man as to the possibilities for increased prestige through the advertising which a truck or delivery wagon brings, and the fact that the competitor of a prospect is using a truck or delivery wagon, may have a good effect. He thinks, however, that the importance of pulling ability, workmanship on the car, and the dozen and one other features going to make up the mechanical equipment cannot safely be overlooked.

Price of Truck Not a Factor

Washington dealers, generally, are inclined to the view that the question of price does not cut as much figure in selling commercial cars as in the selling of pleasure cars. The man who buys a commercial car, they say, acts purely from a business standpoint.

Looking at the proposition in a business way, therefore, he is inclined, say the dealers, to figure on the investment as it would have an effect on his business, and if it would be more advantageous to pay a few hundred or a thousand dollars more to get what he needs, the additional cost would not be figured the same as if he were buying something to add merely to his pleasure, as in the case of a passenger car.

The prevailing view also of the Washington commercial car handlers is that this line of business does not afford much leeway as to methods in the selling of their commercial cars. The same view is held as to the reasons on which their success in handling a commercial car line is based.

MOTOR TRUCK *VS.* HORSE

Concrete illustrations of what a motor truck will do in comparison with a horse-hauled burden equivalent, are not as easily obtained as laudatory generalities on the subject. The motor truck is unquestionably doing great work in nearly all lines of business, but to get accurate figures for comparison is difficult because the average business man doesn't seem to keep his books carefully enough to be able to furnish them.

The Kissel Motor Car Co. has dug up one firm using a fleet of KisselKar trucks, that knows just what they are doing and also just what horses in the same duty formerly did. Their report, therefore, is extremely interesting. It says:

"Last year we kept an account of each of the trucks we own. We found that in the case of the 4-ton truck it cost us for gasoline, oil, tires and repairs, including all new parts used, $2.68 per day for 300 working days. We consider it advantageous to use a driver and helper in the operation of our trucks, which is an additional expense of about $5 per day. We have also estimated as depreciation 15 per cent. on our present inventory valuation, which amounts to about $1 per day. The items added together are as follows:

Gasoline, oil, tires and repairs	$2.68
Driver and helper	5.00
Depreciation	1.00
Total for one day	$8.68

"We have no trouble delivering each day four loads of 4 tons each within a radius of 5 miles, which gives us a delivery charge of $.55 per ton. Of course, as the distance decreases the number of trips increases.

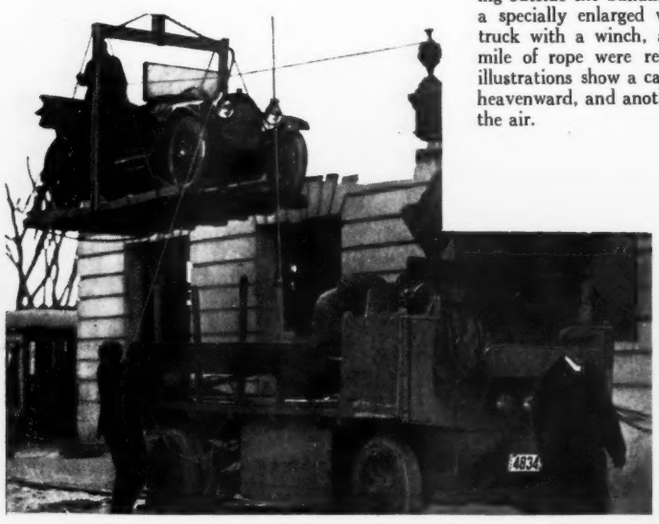
"When we first thought of using trucks for this delivery, we asked ourselves this question: 'Can we deliver as quickly and as positively with automobile trucks as we can with horses?' After 5 years of tests our answer is: 'Five years ago we were using twenty-five horses and one 4-ton KisselKar truck, to-day we are using a 5-ton, 2½-ton, 2-ton and 1-ton truck and four horses. Eighty per cent. of the orders that come in over the telephone are accompanied with the request to ship by truck.

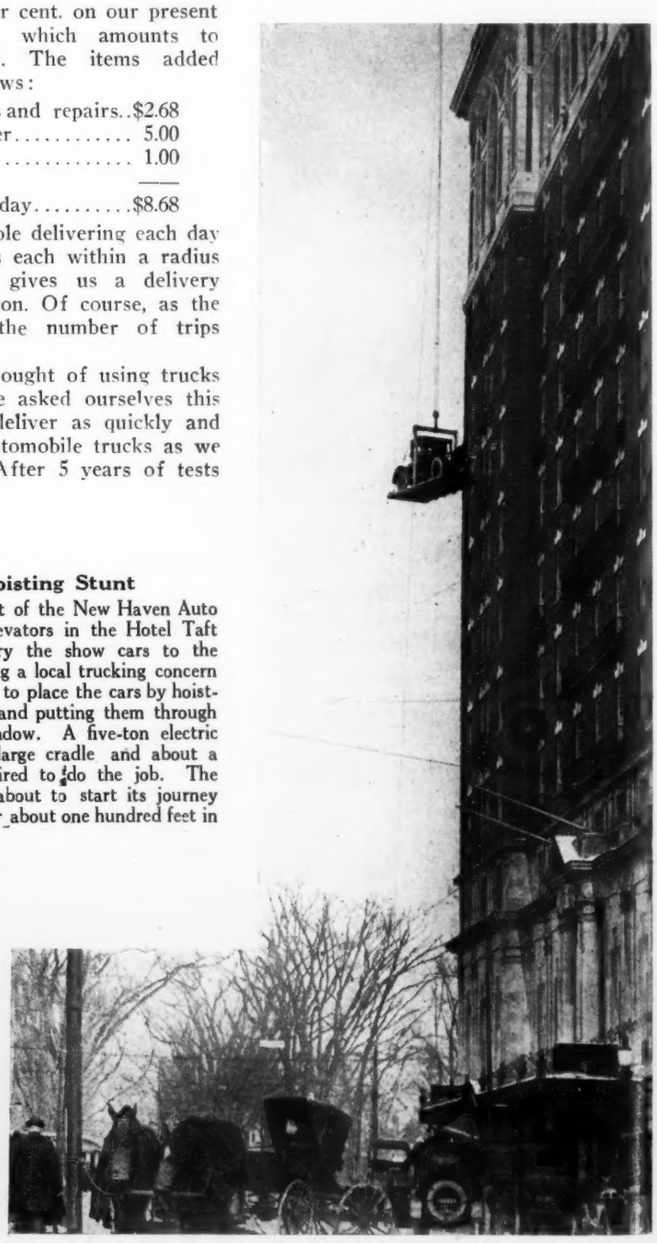
"A horse-drawn vehicle with two good horses drawing at the most 3 tons would not make more than two trips each day within a 5-mile radius. Such a team will cost to operate at least $5 per day, so it is quite easy to figure which would be the cheaper, forgetting the convenience, rapidity and up-to-dateness of the truck over the horse. Barring serious trouble, when the truck comes in at night, it can, if necessity calls again, go on another long journey, while the horse must be put in the barn for rest.

"With horses our deliveries were confined to a comparatively small circle; now we think nothing of going 10, 15 miles or further. For this reason the auto truck user will get the preference often at a better price."

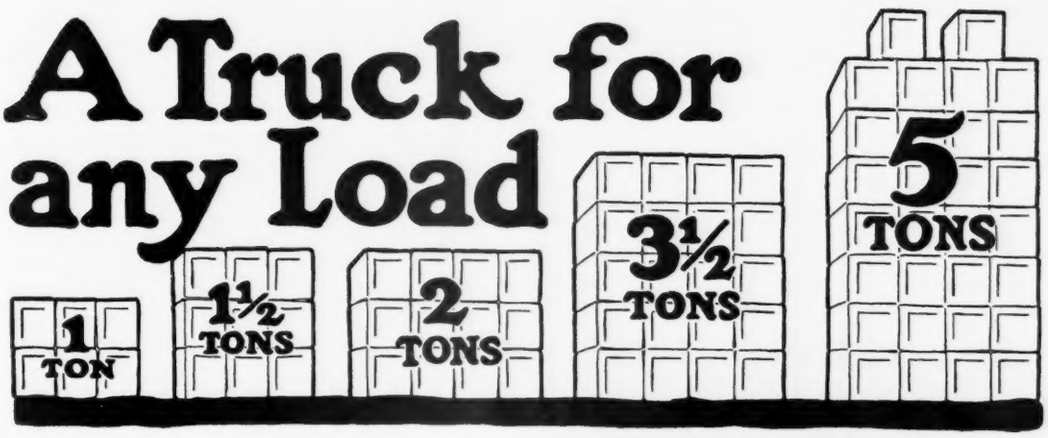
A Novel Hoisting Stunt

When the management of the New Haven Auto Show found that the elevators in the Hotel Taft were inadequate to carry the show cars to the tenth floor of the building a local trucking concern was called in and agreed to place the cars by hoisting outside the building and putting them through a specially enlarged window. A five-ton electric truck with a winch, a large cradle and about a mile of rope were required to do the job. The illustrations show a car about to start its journey heavenward, and another about one hundred feet in the air.





A Truck for any Load



SIGNAL

From one to five tons in capacity, the Signal line assures you of the greatest sales volume in your territory, because:

1st. The range of sizes gives you the greatest number of immediate prospects.

2nd. The constructional units — Continental; Brown-Lipe; Timken, Ross, etc. — are best known to your customers.

3rd. The cleanliness of design makes a very favorable impression which is further enhanced by the service rendered by the truck itself.

WORM DRIVE

Those interested in efficient transportation will find it well worth their time to investigate the Signal line.

Signal Motor Truck Co.
Detroit, Michigan

Activities of the Motor Truck Association of Philadelphia

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LEE J. EASTMAN, President
O. J. DOOLITTLE, Vice President
J. D. HOWLEY, Treasurer
W. H. METCALF, Sec'y, 328 N Broad Street

BOARD OF GOVERNORS

H. M. COALE, E. M. BARTLETT, D. H. ZIMMERMAN, P. S. RUSSELL, W. ROSS WALTON

COMMERCIAL CAR JOURNAL OFFICIAL ORGAN

The question of "Preparedness," "Regulation of Street Traffic," and the National Advertising Club's convention, to be held here in June, received serious attention of the Motor Truck Association of Philadelphia, at its last monthly meeting, at the Hotel Adelphia, where all these topics were treated in a most intelligent and interesting manner. The Association went on record for preparedness without a dissenting voice, after listening to a thrilling, patriotic and convincing address by John Sparhawk, Jr.

The subject of traffic regulation was admirably handled by Police Captain William B. Mills, in charge of the traffic squad, who gave those present some facts and figures regarding the crowded traffic conditions within the central part of the city that opened the eyes of the truck men present to the necessity of some proper action to control vehicles on the city streets. Captain Mills' remarks were based upon an investigation made for the purpose of reporting to Director of Public Safety Wilson, and to make recommendations to remedy the conditions. He said in part: "No one appreciates more than the police department the necessity of prompt action on the subject of regulating street traffic, which has made some intersections in the center of the city almost unsafe for pedestrians, notwithstanding the most careful watchfulness on the part of the policemen stationed there. For instance, on a six-hour count, from one to six p. m., at the eastern entrance to City Hall, we found there were 19,700 pedestrians walking eastward, and 18,250 walking westward, a total of 37,950. At the same point, in a test from four o'clock to five-thirty p. m., we found there is an average of 1000 vehicles, exclusive of trolley cars, moving northward or eastward on Market Street, in addition to 262 trolley cars in that time. That means that 1000 vehicles have to be 'waved' in and around a continual stream of pedestrians with as little delay as possible, and it is evident to us that the limit has about been reached. Practically the same conditions prevail at the western entrance to City Hall, where a six-hour test showed that there were 17,400 people going eastward and 16,304 westward, a total of 33,704. Between the hours of five and six p. m. at the same entrance, that is on the Broad Street Station side, there were 4,556 going west and 1,890 going east, while at lunch hour, from twelve to one p. m., at the same place, there were 5,140 going east and 2,050 going west. At Broad and Chestnut Streets, between two and three p. m. on Saturday, March 11, there were 11,140 going both ways, while at the same hour and same day, at 12th and Market Streets, there were 8,405 going from east to west alone, this being apparently the most congested pedestrian center of the city. These figures show the problem which we are confronting, and the vehicle traffic conditions are equally perplexing. At the rate of increase in the number of automobile licenses taken out in Pennsylvania in the past four years, the vehicle traffic conditions have increased more than 120 per cent. in that period.

"The question of parking cars in the center of streets is also a serious one. For instance, twenty-five cars placed on end can be parked within one square, and as we place them on Broad Street, side by side, about seventy-five cars can be so parked. A one-hour count of parking cars in the area bounded by 16th Street to Delaware, and Walnut Street to Arch, showed there 2,419 cars, most of which, especially on Broad Street, were parked for eight hours. This means that a large portion of these most crowded streets, intended for moving traffic, are blocked by stationary vehicles during the busiest part of the day. These, of course, are mainly pleasure cars, as trucks are offenders only when they are loading or unloading. It might interest you to know that a motor truck twenty-four feet long backed into the curb on Market Street will obstruct all one-way traffic. It is, therefore, a question for you to consider the length of your trucks for city use. The problem, however, is mainly at the intersection of streets, where the limit of congestion has been reached and it is now a matter of apparently eliminating the parking of cars at all."

G. A. Barden, General Manager of the Chicago Pneumatic Tool Co.'s Philadelphia Branch, handling the Little Giant truck, who is Chairman of the Traffic Committee of the Association, read several complaints against traffic conditions, notably on Market Street from 49th to 60th, where vehicles run both ways on one side of the street in order to use an asphalt strip. He said his committee would have some recommendations to remedy conditions later on.

Lee J. Eastman, President of the Association, who presided, asked the co-operation of the members in this respect. Reports were received from chairmen of the various committees showing progressive work.

William B. Tracy, representing the Poor Richard Club Committee in the Advertising Men's Convention, gave a glowing description of their plans for the convention week, for both business and pleasure, and asked the co-operation of the business men present in making the event a success, inviting them to join the Associate Membership list and to help out financially in the entertainment of the 10,000 visitors expected here that week. From the plans outlined by Mr. Tracy the city will witness one of the greatest pageants and other features ever given in this city.

Phillip Kind, also of the Poor Richard Club, spoke more on the practical side of the Advertising Convention, which, he said, would advertise Philadelphia and her industries as never before and would bring business to her door.

R. E. Chamberlain, of the Garford-Philadelphia Co., moved that the Association supply the Convention with anything to make it a success, and President Eastman appointed Messrs. Chamberlain, Taxis and Hoover a committee to co-operate in that work.

E. B. Jackson, of the Packard Motor Car Co., of New York City, former President of the Association, was called upon to urge the motor truck men to interest themselves in the "Preparedness" movement for the benefit of this country.

Los Angeles Pressed Brick Co. has displaced 12 teams since it purchased its first commercial car four years ago. Now three trucks,—two Alcos and a Packard—do all the hauling of brick and tiling for the company.

Motor trucks are used for hauling imported goods from the Pacific port of Amapala, Honduras, to Tegucigalpa, a distance of approximately 90 miles over the recently completed highway. This road has done much to make automobiles popular in Honduras; there are no railroads and the section is rough and mountainous.

"ANTI-KNOCKING PLEDGE"

To
THE AUTOMOBILE TRADES ASSOCIATION
of Colorado

FOR THE PROMOTION OF HARMONY AND CO-OPERATION BETWEEN TRADESMEN, BY WHICH TO IMPROVE TRADE CONDITIONS, UPBUILD THE INDUSTRY AND BETTER THE SERVICE TO OUR CUSTOMERS.

WE PLEDGE OURSELVES TO OUR ASSOCIATION, TO REFRAIN FROM ALL FORMS OF MALICIOUS **"KNOCKING"** AGAINST ANY INDIVIDUAL OR BUSINESS ESTABLISHMENT; THE MEN THEY EMPLOY OR THE WORK THEY DO; THE CAR OR SUPPLIES THEY SELL OR THE SERVICES THEY FURNISH.

WE WILL MAKE ALL OUR FIRM MEMBERS AND EMPLOYEES PARTIES TO THIS AGREEMENT

AND, SHOULD WE HAVE A CRITICISM OR COMPLAINT TO MAKE AGAINST ANOTHER MEMBER OF OUR ASSOCIATION, WE WILL TAKE UP THE MATTER WITH THAT MEMBER IN PERSON, OR TURN IT OVER TO THE SECRETARY FOR ADJUSTMENT BY THE "GRIEVANCE COMMITTEE."

Signed_____

By_____

DENVER, MARCH 30, 1915

"No 'Knock' in Colorado"

The above pledge has been sent to all dealers of Colorado and is expected to promote co-operation among the automobile trade.

The CCJ leads in circulation, advertising and prestige